DOCUMENT RESUME

ED 070 202 EA 004 753

TITLE	Specifications for the First CSP Building System.
INSTITUTION	Detroit Public Schools, Mich.
SPONS AGENCY	Detroit Board of Education, Mich.; Educational Facilities Labs., Inc., New York, N.Y.
PUB DATE	16 Nov 70
NOTE	230p.
EDRS PRICE	MF-$0.65 HC-$9.87
DESCRIPTORS	Architects; Architectural Elements; Bids; *Component Building Systems; Construction Management; Contracts; Controlled Environment; Critical Path Method; Facility Requirements; Fast Track Scheduling; Legal Responsibility; Lighting; Planning (Facilities); *School Construction; *Specifications; Structural Building Systems; *Systems Approach
IDENTIFIERS	*Construction Systems Program

ABSTRACT

The specifications cover the construction of additions to four schools in the Detroit School District. The Construction Systems Program (CSP) was utilized in an attempt to (1) reduce the cost of school construction and provide improved value for the building dollar in terms of function, environment, first cost, and maintenance cost; (2) accelerate construction time; and (3) provide the occupants greater flexibility to better meet educational needs. This document is arranged according to the information for bidders; the contract requirements; and the specifications for the sub-systems of structure, atmosphere, lighting-ceiling, interior space division, and vertical skin. Addendums cover scheduling requirements, fire protection interpretations, and specification clarifications. Terms are defined; owner, contractor, and architect responsibilities are outlined; and proposal forms are supplied. (Pages II-1-8 and II-2-2 may reproduce poorly.) (Author/MLF)

ED 070202

DETROIT PUBLIC SCHOOLS
CONSTRUCTION SYSTEMS PROGRAM
51 WEST HANCOCK AVENUE
DETROIT, MICHIGAN 48201
313/833-7900, EXT. 2762

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EA 004 753

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SPECIFICATIONS for The FIRST CSP BUILDING SYSTEM

Projects:

BOYNTON SCHOOL ADDITION
Visger Road near Fort Street, Detroit, Michigan
Howard Sims and Associates, Architects

CERVENY SCHOOL ADDITION
Strathmoor between Pilgrim and Puritan, Detroit, Michigan
King and Lewis Architects, Inc.

SHERRARD SCHOOL ADDITION
Chrysler Freeway near Euclid, Detroit, Michigan
Nathan Johnson and Associates, Inc., Architects

DELBERT E. ROBERTS ADDITION to COOLEY HIGH SCHOOL
Hubbell between Fenkell and Chalfonte, Detroit, Michigan
Kissinger-Holzhauer, Inc., Architects

for the BOARD of EDUCATION, CITY of DETROIT

Detroit Public Schools CONSTRUCTION SYSTEMS PROGRAM
51 West Hancock Avenue, Detroit, Michigan 48201

November 16, 1970

SPECIFICATIONS for the FIRST CSP BUILDING SYSTEM

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ADVERTISEMENT FOR BIDS

Board of Education
Detroit, Michigan

The Board of Education, City of Detroit, will receive sealed bids for the erection and completion of sub-systems for four school additions in the City of Detroit until 3:00 p.m., E.S.T., on Thursday, January 14, 1971.

All bids should be addressed to the Board of Education, Business Manager's Office, 5057 Woodward, Detroit, Michigan 48202, where they will be publicly opened and read aloud at the aforementioned time.

The Projects are as follows:

BOYNTON SCHOOL ADDITION
Visger Road near Fort Street, Detroit, Michigan
Howard Sims and Associates, Architects

CERVENY SCHOOL ADDITION
Strathmoor between Pilgrim and Puritan, Detroit, Michigan
King and Lewis Architects, Inc.

SHERRARD SCHOOL ADDITION
Chrysler Freeway near Euclid, Detroit, Michigan
Nathan Johnson and Associates, Inc., Architects

DELBERT E. ROBERTS ADDITION TO COOLEY HIGH SCHOOL
Hubbell between Fenkell and Chalfonte, Detroit, Michigan
Kissinger-Holzhauer, Inc., Architects

The projects total approximately 280,000 square feet in gross floor area. Three of the additions are two-story. One addition is one-story. Materials and methods of construction will be similar for the designated sub-systems on all four buildings.

Separate proposals for each sub-system will be received from qualified bidders for furnishing and installing integrated sub-systems work on the following basis:

Proposal No. 1. Sub-System No. 1 - STRUCTURE
Proposal No. 2. Sub-System No. 2 - ATMOSPHERE
Proposal No. 3. Sub-System No. 3 - LIGHTING-CEILING
Proposal No. 4. Sub-System No. 4 - INTERIOR SPACE DIVISION
Proposal No. 5. Sub-System No. 5 - VERTICAL SKIN

Bidding Documents may be obtained at the office of the Detroit Public Schools CONSTRUCTION SYSTEMS PROGRAM, 51 West Hancock (third floor), Detroit, Michigan 48201. Complete sets of Bidding Documents (Drawings and Specifications) will be available for a deposit of $125.00. Firms returning their sets in good condition within twenty (20) days after the bid opening date will receive a full refund. Additional sets of drawings or specifications, if ordered, will be furnished upon payment of the cost of reproduction; but no refund will be made for the return of such sets.

2 - Advertisement for Bids

In order to obtain bidding documents, each prospective bidder is required to complete and submit to the CSP Office an Equal Opportunity Survey Form, blank copies of which are available at the CSP Office.

Proposals must be submitted in the form provided by CSP, and must be accompanied by a certified check, bank draft, or satisfactory Bid Bond payable to the Board of Education, City of Detroit, in an amount not less than five per cent (5%) of the base bid.

The accepted bidders will be required to furnish a satisfactory Performance Bond and a Labor and Materials Payment Bond, in accordance with the requirements of the Notice to Bidders.

All proposals submitted shall remain firm for a period of 60 days after the bid opening date.

The Board of Education reserves the right to waive any informality in the bids, or to reject any or all bids, in whole or in part, should it be deemed in its best interest to do so.

Harold Brown, Business Manager
Board of Education
City of Detroit

NOTICE TO BIDDERS

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NOTICE TO BIDDERS

Item 1. Introduction

1.1 The Detroit Public Schools CONSTRUCTION SYSTEMS PROGRAM seeks to:

- .1 Reduce the cost of school construction and give improved value for the school building dollar in terms of function, environment, first cost and maintenance cost.
- .2 Accelerate construction time for school buildings.
- .3 Provide the occupants of school buildings greater flexibility in their facilities in order to better meet educational needs.

1.2 In order to accomplish the objectives stated above, the CONSTRUCTION SYSTEMS PROGRAM has organized the First CSP Building System. A simple definition of a building system is, "A set of building parts conceived as a whole and manufactured to assemble with ease and without adjustment or waste." Effective use of a building system requires a high degree of component compatability between sub-systems based not only on modular coordination but on management and scheduling coordination.

1.3 The First CSP Building System is also a bulk-purchasing plan in order to gain the advantage of cost reduction through buying in larger quantities. Sub-system contracts will be awarded for the lowest acceptable, compatible collective bulk price. The sub-systems will be developed, fabricated, and erected by industry in open competition. The sub-system components will be integrated into the designs of the various schools, each with its own architect.

1.4 The quality of the sub-systems will be evaluated on the basis of: a) performance, b) cost, c) aesthetics. The performance specifications for each sub-system state as clearly as possible what the sub-system must do. In general, they do not state what materials will be used. Wherever possible, the test procedure used to evaluate the acceptability is stated in the specification. Where no recognized standard test exists, the judgement of choice will be made by the CSP Technical Director, assisted by the CSP Advisory Committee, the CSP Consultants, and the Director of Building Program Coordination, School Housing Division, Detroit Public Schools.

1.5 Although the primary concerns in evaluating the bids will be functional and economic, consideration will also be given to aesthetic quality in regard to particular sub-systems. The Detroit Public Schools will seek simplicity of surface and detailing while leaving individual expression to each project architect. The Detroit Public Schools will reserve the right to reject sub-system bids for materials or designs that they consider unsuitable aesthetically.

Item 2. Contract Assumptions

2.1 The nature of the Construction Systems Program makes necessary certain variations in the usual bidding procedures of the Detroit Public Schools. However, virtually all of the forms of agreement and conditions of the contract are based on documents normally used by the Detroit Public Schools.

2.2 The Construction Systems Program will operate under a dual contract procedure. Series One contracts will select the successful sub-systems. The sub-systems will be coordinated through an interfaced bidding procedure described below. Under the Series One contracts, all work covered by a given sub-system will be awarded to a single contractor for all schools in the program. Those portions of the total bidding not covered by the five sub-systems bid as part of the Series One contracts for the schools in the program will be classified as non-systems work. This work including alterations to existing buildings, will be drawn and specified by the project architects, and bid and executed in the traditional manner by the general contractor who will be invited to bid for the construction of the schools on a group basis, acting also in a coordinative management capacity.

2.3 After the Owner has received bids from the General Contractors and made an award of contract, he will assign the building sub-system contracts to the General Contractor for administration. The sub-systems Contractors will work under the direction of the General Contractor and will be paid directly by the Owner on the certificate of payment approved by the General Contractor as to satisfactory progress and completion.

2.4 Althouth bidders are free to work together on an integrated system, bids will only be considered on an individual sub-system basis as outlined in the bidding forms provided. In order to assure that bidders whose sub-systems adjoin have prepared their bids in cooperation with others, a minimum of two prices will be required from each bidder based on variations (if any) in price related to the balancing of responsibilities under terms of the mandatory interface. Bids should be submitted on a lump sum basis for the volume of construction indicated on the schematic drawings of sub-system utilization. This lump sum shall be noted on the Proposal Forms as the Base Bid. The bidder is required to submit at least one alternate price. The sub-system coordination will need to be achieved by the bidders themselves or by retaining a professional-technical coordination service.

2.5 Proposals shall be made upon the agreement that if the bidder is awarded a contract, he will either do the entire work himself, or he will sublet the same, or any portion thereof, only to parties mentioned in the Proposal Form or approved by the Owner, it being understood and agreed that any difference in price caused by any substitution of sub-contractors that may be desired by the Owner shall be adjusted before a contract is executed.

Item 3. Bidding Documents

3.1 The CSP Office will lend sufficient sets of the bidding documents for the use of the prospective bidders, subject to the deposit requirements stated in the Advertisement for Bids; such bidding documents, being the property of the CSP office, shall be returned to them within twenty (20) days after date of bid opening.

3.2 Bidding documents used by the prospective bidders shall be returned to the CSP office in good condition, without being marked, stamped, or otherwise defaced, either on the face or the back.

3.3 A check or cash deposit in the amount stipulated in the Advertisement for Bids is required for each set of bidding documents borrowed, and is to be refunded when said bidding documents are returned.

3.4 Attention of the bidders is drawn to the fact that the information concerning the work of a sub-system contractor may be found at any point in their specification. For convenience, many of the requirements have been grouped under sub-system headings, but an instruction to a sub-system contractor indicating a duty or responsibility is binding upon him no matter where in the specification it appears.

3.5 Bidders shall carefully examine the specifications. Bidders shall satisfy themselves as to the sufficiency of the specification and shall not at any time after the submission of the bid dispute or complain of such specifications or the directions explaining or interpreting them or assert there is any misunderstanding with regard to the location and nature and amount of work to be performed.

3.6 Bidders desiring explanation concerning any portion of the work during the time of estimating may obtain the same by making application in writing to the CSP office, provided that such requests shall be made at least ten (10) days before the date set for submission of bids.

3.7 Should a bidder find apparent discrepancies in, or omissions from, the bidding documents, or should he be in doubt as to their true meaning, or should he have any question regarding any work or materials intended by the bidding documents, then such bidder, shall immediately notify the CSP office of such question. The CSP office will issue an addendum to all contractors recorded in the office as being prospective bidders. It shall be the responsibility of the contractors on record to provide all their subcontractors with the information contained in these addenda, as well as all information in the total specifications document including the Notice To Bidders, General Conditions, and Supplementary General Conditions.

3.8 It shall be understood and agreed by all parties submitting proposals on any part of the work that the requirements contained in all contract documents shall apply to all addenda issued before the time set for receiving bids, that the general character of work called for in the addenda shall be the same as originally required for similar work, unless otherwise mentioned, and that all incidental work necessitated shall be included, even though not particularly specified therein.

Item 4. Proposals

4.1 Sealed proposals, based upon the following specifications and the accompanying drawings, will be received at the Office of the Detroit Board of Education, 5057 Woodward, Detroit, Michigan, 48202, in accordance with the Advertisement for Bids published by said Board.

4.2 Sealed proposals, equal employment opportunity compliance survey, and accompanying certified checks or bid bonds, must be filed with the Business Manager not later than 3:00 p.m., on the date of bid opening set forth in the Advertisement for Bids, and will be opened at 3:00 p.m. on the same day.

4.3 Proposal shall be submitted in duplicate and be made only upon forms provided by the office of CSP. Proposal forms will be furnished to prospective bidders in triplicate; the bidder is to retain one copy of the proposal as submitted. Proposals in any other form will be rejected. If more than one sub-system is being bid, each bid should be in its own separate envelope properly marked.

4.4 Each proposal shall be sealed in an opaque envelope and marked with the name of the sub-system bid, the name "Detroit Public Schools Construction Systems Program", and the name of the bidder.

4.5 Each bidder shall write out the total amount of the bid in addition to inserting the same in figures. All bids shall be clearly written and submitted without erasures or interlineations. If any bid is presented erased or interlined, it will not be considered by the Owner.

4.6 In case a bid be submitted by a corporation, it must be signed in the name of such corporation by a duly authorized officer or agent thereof.

4.7 Proposals shall be filled in completely, as called for in the proposal forms. Every person, firm, or corporation submitting any proposal for construction work, equipment, materials, or services of any kind shall furnish with such proposal a certified check which shall be forfeited to the Owner in case of failure of the bidder to sign a contract after acceptance of the bid by the Owner, or a bid bond insuring the Owner that the contractor will enter into a contract in accordance with the terms of his bid; the amount to be at least equal to five percent(5%) of the base bid, and made payable to the Owner. Where any bidder refuses to enter into a contract in accordance with the terms of his proposal, the Owner will consider that as a factor with respect to any future bids made by him, and may refuse to consider the same for that reason.

4.8 No oral, telegraphic, or telephone proposals or modifications to proposals will be considered unless confirmed in writing before the time set for the termination of the bidding period.

4.9 Each bidder's proposal shall include, in addition to the completed Proposal Form, full descriptive and graphical information on the particular sub-system. Depending on the sub-system, this documentation may be either preliminary shop drawings or catalog data, but, in any event, it should give full assembly details and evidence of successful interfacing with other bid submissions. Either photographs or diagrams should fully explain the submissions, including the proposed methods of connecting to other sub-systems or non-systems and the proposed erection techniques.

4.10 Each Bidders proposal must contain test results or other written indication that the sub-system, as offered, is acceptable to all regulatory agencies or other authorities, governmental or otherwise, having jurisdiction.

4.11 Bidders for a Contract shall also include in their proposals such alternate proposals and/or unit prices as may be called for in the specifications. Each contractor or subcontractor involved in such alternate proposals or unit prices shall include all labor and materials required for a completed condition in accordance with the true intent and meaning of the contract documents, whether or not each and every item required by reason thereof is particularly specified or shown on the drawings. All work included in alternate proposals and/or unit prices shall be governed by the terms of the contract documents. Except where separable bids on items within the proposal are specifically permitted by the proposal, a price or figure must be filled in for each item; otherwise the bid may be rejected as irregular. Unit prices for the various components per school will be required at receipt of bids, and they must be calculated in such a manner that their application will not yield an aggregate price exceeding the lump sum bid.

Item 5. Examination of Premises

5.1 Before submitting proposals for the work, each bidder will be held to have examined the premises, including the sites, and satisfied himself as to the existing conditions under which he will be obliged to operate in performing his part of the work, or that will in any manner affect the work under his contract.

Item 6. Contract Security

6.1 Simultaneously with the execution and delivery of the Contract Agreement between Owner and the Contractor designated by the Owner, the said Contractor shall qualify for, sign, and deliver to the Owner an executed Performance Bond and an executed Labor and Materials Payment Bond secured by a Surety Company approved by the Owner, on forms provided by the Owner, each in the amount of one hundred percent (100%) of the Contract Agreement. All of which bonds shall be attached to and made a part of the agreement between the Owner and the General Contractor.

6.2 Attorney-in-fact who signed the Contract Bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

6.3 The premiums for the aforementioned bonds shall be paid in full by the Owner to the General Contractor at the time the first application for payment is made. The billing from the Surety Company to the General Contractor shall be attached to this application for payment.

Item 7. Firm Bid

7.1 All proposals submitted shall remain firm for a period of 60 days after the official opening of bids. Before the expiration date, the designated successful Sub-System Contractors shall sign contract agreements with the Owner based on the proposals and the scheduling program outlined below. Copies of the Agreement Form are available for examination in the CSP office.

Item 8. Scheduling Program

8.1 The Construction Systems Program shall be scheduled by the Critical Path Method, and will apply to all phases of the work, including fabrication, delivery, and site erection. All contract proposals shall be submitted with the acknowledgment of, and in conformance to, the CPM schedule as part of the conditions of the contract. The Owner shall issue the CPM project scheduling system to all bidders, prior to the receipt of bids, which will thoroughly describe the scheduling requirements and include the appropriate documents. Progress will be monitored on a continuing basis under the terms of the scheduling program covering the interconnection of all contract trades.

Item 9. Owner's Choice

9.1 The Board of Education of the City of Detroit will consider the lowest responsible bidder for any category or combination of bidders whose proposal best responds in quality, fitness and capacity to the particular requirements of the proposed work. Bidders are expressly notified that no deviations from performance specifications will be allowed. However, it is understood that no two manufacturer's products are identical. The CSP office will make the judgement if there is a deviation, rejecting or accepting in the Owner's best interest.

9.2 The Board of Education of the City of Detroit reserves the right to accept other than the lowest bid, to waive any informality in the bids, or to reject any or all bids, in whole or in part, should it be deemed in its best interests to do so.

Item 10. Property Rights in System Name

10.1 The names "Detroit Public Schools Construction Systems Program" or "The First CSP Building System" or derivations thereof shall be vested in the Detroit Public Schools. Those names cannot be used in conjunction with the marketing of building products without permission of the Detroit Public Schools.

Firm Name:_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 1

SUB-SYSTEM NO. 1 - STRUCTURE

(Submit in Duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 1 Work - Structure

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility, and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments and itemized breakdown per school for the system below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. This sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____ Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

P.3 (cont) INTERFACING BIDDER BY CHOICE

	PRICE ADJUSTMENT
Re Sub-System No. 2 - Atmosphere	
1st	Base Bid
2nd	$
3rd	$
Re Sub-System No. 3 - Lighting-Ceiling	
1st	Base Bid
2nd	$
3rd	$
Re Sub-System No. 4 - Interior Space Division	
1st	Base Bid
2nd	$
3rd	$
Re Sub-System No. 5 - Vertical Skin	
1st	Base Bid
2nd	$
3rd	$

P.4 All work covered by the following Addenda is included with this Proposal. The Base Bid shall include:

Addendum No. _____, dated _____
Addendum No. _____, dated _____
Addendum No. _____, dated _____
Addendum No. _____, dated _____

P.5 In compliance with the instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master CPM Progress Schedule prepared by the Owner.

P.6 The following separate prices are included in the Base Bid, but are brought forth for information and/or accounting purposes.

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($)

2) Cerveny School Addition

The sum of _____ Dollars ($)

P.6 (cont) Cost Breakdown per School (continued)

3) Sherrard School Addition

The sum of _____ Dollars ($)

4) Delbert E. Roberts Addition to Cooley High School

The sum of _____ Dollars ($)

P.7 General

P.7.1 The lump sum bid shall be based on the quantities of components and special conditions contained herein.

P.7.2 The quantities are to be obtained from the preliminary sketch plans of the four schools in the CSP school building program with an aggregate total floor area of not less than 250,000 square feet of total floor area.

P.7.3 Unit cost figures are required to be supplied by the successful bidder. Depending upon the effects of other Sub-Systems on the Structure Sub-System, alternate unit prices may be quoted. The total cost of all the components and the special conditions listed taken at their respective unit cost shall equal the lump sums quoted.

P.7.4 The unit prices quoted shall include all developing cost and testing, material and workmanship, overhead and applicable taxes.

P.7.5 The undersigned submits the following Unit Prices which shall govern for authorized additions or deductions in the work and shall include all charges for supervision, overhead, and profit, and shall be applied to net differences in quantities. The following Unit Prices are to be used as a basis for negotiating additions to/or deductions from the Contract.

P.7.6 Bidders will be evaluated primarily on the basis of the composite total price of a complete set of Sub-Systems, but the degree of consistency, performance and the effects of the structure on the foundations will also be considered.

P.7.7 Cost of levelling plates, base plates, and anchor bolts shall be included in the unit prices for the columns.

P.7.8 Principal components:

- floor and roof deck elements
- spanning members
- columns
- wind bracing

P.7 General (continued)

P.7.9 Special conditions forming part of the Sub-System:

- spandrel beams (spanning members subject to additional loads from the Vertical Skin Sub-System)
- expansion joints along column lines
- changes in floor and roof levels
- small openings including trimming
- large stair openings in floors including trimming
- fire-proofing
- provisions at the top of columns for future extensions.

P.8 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead, and profit, and shall be applied to the net differences in quantities. The following unit prices are to be used as a basis for negotiating additions and/or deductions in the Contract:

P.8.1 Number and Description of Unit Prices.

		ADD	DEDUCT
1)	Structural Concrete for any purpose, in place, complete, except forms and reinforcing steel, per cu.yd.	$ _____	$ _____
2)	Reinforcing Steel for structural concrete, including supports, bending and placing, per pound	$ _____	$ _____
3)	Formwork for structural concrete including all walling, bracing, oiling, cleaning and appurtenant work, and removal, in place, complete, per square foot of concrete contact surface	$ _____	$ _____
4)	Structural Steel for any purpose, in place, complete, except miscellaneous iron, per pound	$ _____	$ _____

P.8 Unit Prices (continued)

P.8.1 (cont) Number and Description of Unit Prices (continued)

	ADD	DEDUCT
5) Miscellaneous Steel for any purpose, in place, complete, except structural steel, as defined by the bidder on this proposal form or later as defined by the Owner, per pound	$_____	$_____
6) Other structural materials for any purpose as may be appropriate	$_____	$_____

P.9 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.10 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education, of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bonds and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.11 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions, and agrees to abide by the conditions set forth.

P.12 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual.

b. ( ) Partnership, having the following partners:

1._____

2._____

3._____

c. ( ) Corporation, incorporated under the State Laws of

_____.

P.13 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date

Firm Name

_____

_____

By_____

In the Presence of

Title_____

_____

Official Address:

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the Proposal shall be declared irregular.)

Firm Name_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 2

SUB-SYSTEM NO. 2 - ATMOSPHERE

(Submit in duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 2 Work - Atmosphere

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. The sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the sum of _____
Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

Proposal No. 2 (Continued)

P.3 (cont.) INTERFACING BIDDER BY CHOICE — PRICE ADJUSTMENT

Re Sub-System No. 1 - Structure

1st	BASE BID
2nd	$
3rd	$

Re Sub-System No. 3 - Lighting-Ceiling

1st	BASE BID
2nd	$
3rd	$

Re Sub-System No. 4 - Interior Space Division

1st	BASE BID
2nd	$
3rd	$

Re Sub-System No. 5 - Vertical Skin

1st	BASE BID
2nd	$
3rd	$

P.4 All work covered by the following Addendum is included with this Proposal.

The Base Bid shall include:

Addendum No._____, dated_____

Addendum No._____, dated_____

Addendum No._____, dated_____

P.5 In compliance with instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master C.P.M. progress schedule prepared by the Owner.

Proposal No. 2 (Continued)

P.6 The following Separate Prices are included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($_____)

2) Cerveny School Addition

The sum of _____ Dollars ($_____)

3) Sherrard School Addition

The sum of _____ Dollars ($_____)

4) Delbert E. Roberts Addition to Cooley School

The sum of _____ Dollars ($_____)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead and profit, and shall be applied to the net differences in quantities.

The following unit prices are to be used as a basis for negotiating additions and/or deductions to the contract:

P.7.1 Number and Description of Unit Prices

Space Type	Refer to Item	Sq. Ft. Gross	Control Zones	Lump Sum	(Unit Price $/sq. ft.)
General Academic	2.5.2	_____	_____	$_____	_____
Automotive Shop	2.5.3	_____	_____	$_____	_____
Science	2.5.4	_____	_____	$_____	_____
Music	2.5.5	_____	_____	$_____	_____
Admin & Guidance	2.5.6	_____	_____	$_____	_____
Ind. Arts(Shops)	2.5.7	_____	_____	$_____	_____
Gen.Purpose Rooms	2.5.8	_____	_____	$_____	_____
Physical Education (Locker & Change)	2.5.9	_____	_____	$_____	_____
Food Service (Kitchen)	2.5.10	_____	_____	$_____	_____
Misc. Spaces	2.5.11	_____	_____	$_____	_____
5 Year Service Contract with Option for 10 years.					
Total		_____	_____	$_____	_____

Proposal No. 2 (Continued)

P.7.1 Number and Description of Unit Prices (Continued)

The sum of _____

_____ Dollars ($ _____),

OPERATORS AND MAINTENANCE COST

NOTES:
1. Attach detailed Calculations for Each Item, Add any Item not listed but necessary for Guarantee.
2. Include Summary of Cost.

OPERATOR'S COST

Contractor Maintenance

Full Time Maintenance $/Yr._____

OPERATOR'S COST $/Yr._____

MAINTENANCE COST

For the First 5 Years.

1. Replacement of all parts including refrigerant fluid $_____
2. Routine maintenance, such as lubrication, filter changing, water treatment, automatic control adjustments, etc $_____
3. Emergency service $_____

TOTAL FOR FIRST 5 YEARS $_____

MAINTENANCE COST $/Yr._____

OPERATORS' AND MAINTENANCE COST $/Yr._____

Proposal No. 2 (Continued)

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals shall be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bonds and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.10 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1._____

2._____

3._____

c. ( ) Corporation, incorporated under the state laws of

_____.

P.11 The undersigned does hereby declare and stipulate that this proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date

_____

In the Presence of

_____

Firm Name

_____

By_____

Title_____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the proposal shall be declared irregular).

Firm Name_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 3

SUB-SYSTEM NO. 3 - LIGHTING-CEILING

(Submit in duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 3 Work - Lighting-Ceiling

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. The sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____
Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

Proposal No. 3 (Continued)

P.3 (cont) INTERFACING BIDDER BY CHOICE — PRICE ADJUSTMENT

Re Sub-System No. 1 - Structure

1st _____ Base Bid _____

2nd _____ _____

3rd _____ _____

Re Sub-System No. 2 - Atmosphere

1st _____ Base Bid _____

2nd _____ _____

3rd _____ _____

Re Sub-System No. 4 - Interior Space Division

1st _____ Base Bid _____

2nd _____ _____

3rd _____ _____

P.4 All work covered by the following Addendum is included with this Proposal.

The Base Bid shall include:

Addendum No._____, dated _____

Addendum No._____, dated _____

Addendum No._____, dated _____

Addendum No._____, dated _____

P.5 In compliance with instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master C.P.M. progress schedule prepared by the Owner.

Proposal No. 3 (Continued)

P.6 The following Separate Prices are included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition:

The sum of _____ Dollars ($_____)

2) Cerveny School Addition

The sum of _____ Dollars ($_____)

3) Sherrard School Addition

The sum of _____ Dollars ($_____)

4) Delbert E. Roberts Addition to Cooley School

The sum of _____ Dollars ($_____)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead and profit, and shall be applied to the net differences in quantities.

The following unit prices are to be used as a basis for negotiating additions and/or deductions to the contract:

P.7.1 Number and Description of Unit Prices

Lighting Classification	Acoustic Level	Area Sq. Ft.	Cost ($)	Unit Price $/Sq. Ft. Add	Deduct
L1	AC1				
L1	AC2				
L2	AC1				
L2	AC2				
L3	AC1				
L3	AC2				
L4	AC1				
L4	AC2				

Proposal No. 3 (Continued)

P.7.1 Number and Description of Unit Unit Prices (Continued)

_____ square feet of vertical closure Panels installed (See 3.3.2

$_____

Unit price per square foot installed $_____

_____square feet of 12" deep vertical panels to accommodate a lower ceiling area (See 3.5.4) $_____

Unit price per square foot installed $_____

_____square feet of 24" deep vertical panels to accommodate a lower ceiling area (See 3.5.4) $_____

Unit price per square foot installed $_____

_____square feet of ceiling panel (See 3.6.1.6) $_____

Unit price per square foot installed $_____

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bonds and the Labor and Materials Payment Bond are to be included in Proposal Sum.

Proposal No. 3 (Continued)

P.10 The un dersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions, and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1._____

2._____

3._____

c. ( ) Corporation, incorporated under the state laws of_____.

P.12 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date

_____

In the Presence of

_____

Firm Name

_____

By_____

Title_____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal, otherwise the proposal shall be declared irregular).

Firm Name:_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 4

SUB-SYSTEM NO. 4 - INTERIOR SPACE DIVISION

(Submit in Duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 4 Work - Interior Space Division

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility, and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. This sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____ Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

P.3 (cont)

INTERFACING BIDDER BY CHOICE	PRICE ADJUSTMENT
Re Sub-System No. 1 - Structure	
1st	Base Bid
2nd	
3rd	
Re Sub-System No. 2 - Atmosphere	
1st	Base Bid
2nd	
3rd	
Re Sub-System No. 3- Lighting-Ceiling	
1st	Base Bid
2nd	
3rd	
Re Sub-System No. 5 - Vertical Skin	
1st	Base Bid
2nd	
3rd	

P.4 All work covered by the following Addenda is included with this Proposal. The Base Bid shall include:

Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____

P.5 In compliance with the instructions in the Notice to Bidders the undersigned states that the completion of this project will be in accordance with the Master CPM Progress Schedule prepared by the Owner.

P.6 The following separate prices are included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($)

2) Cerveny School Addition

The sum of _____ Dollars ($)

3) Sherrard School Addition

The sum of _____ Dollars ($)

4) Delbert E. Roberts Addition to Cooley High School

The sum of _____ Dollars ($)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead, and profit, and shall be applied to the net differences in quantities. The following unit prices are to be used as a basis for negotiating additions and/or deductions in the Contract.

P.7.1 Number and Description of Unit Prices:

1) Relocatable Partition (non-rated)	10'-0" high		12'-0" high	
	ADD	DEDUCT	ADD	DEDUCT
1. Solid Panel (unfinished)	$	$	$	$
2. Wire Glass above 7'-0"				
3. Wire Glass above 3'-0"				
4. Fully glazed - Wire Glass				

P.7.1 Number and Description of Unit Prices: (continued)

2) Relocatable Partition (Rated 1-hour) per lin. ft.	10'-0" high		12'-0" high	
	ADD	DEDUCT	ADD	DEDUCT
1. Solid Panel (unfinished)	$	$	$	$
2. Clear Glass above 3'-6"				

3) Acoustic Rated per lin. ft.	10'-0" high		12'-0" high	
	ADD	DEDUCT	ADD	DEDUCT
1. Solid Panel (unfinished)	$	$	$	$
2. Clear Double Glazed above 3'-6"				

4) Doors Including Frame per unit	ADD	DEDUCT
3'-0" x 7'-0" Solid	$	$
3'-0" x 7'-0" Acoustic Rated		
2 @ (3'-0" x 7'-0" Solid		

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Bond as stipulated. The premiums on the Performance Bond and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.10 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions, and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1. _____

2. _____

3. _____

c. ( ) Corporation, incorporated under the State Laws of

_____.

P.12 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date

_____

In the Presence of

_____

Firm Name

_____

By _____

Title _____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the Proposal shall be declared irregular.)

Firm Name_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 5

SUB-SYSTEM NO. 5 - VERTICAL SKIN

(Submit in Duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 5 Work - Vertical Skin

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility, and tranportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. This sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____ Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

P.3 (cont) INTERFACING BIDDER BY CHOICE — PRICE ADJUSTMENT

Re Sub-System No. 1 - Structure

1st _____ Base Bid _____
2nd _____ _____
3rd _____ _____

Re Sub-System No. 3 - Lighting-Ceiling

1st _____ Base Bid _____
2nd _____ _____
3rd _____ _____

Re Sub-System No. 4 - Interior Space Division

1st _____ Base Bid _____
2nd _____ _____
3rd _____ _____

P.4 All work covered by the following Addenda is included with this Proposal. The Base Bid shall include:

Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____

P.5 In compliance with instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master CPM Progress Schedule prepared by the Owner.

P.6 The following separate prices are included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($)

2) Cerveny School Addition

The sum of _____ Dollars ($)

3) Sherrard School Addition

The sum of _____ Dollars ($)

4) Delbert E. Roberts Addition to Cooley High School

The sum of _____ Dollars ($)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead, and profit, and shall be applied to the net differences in quantities. The following unit prices are to be used as a basis for negotiating additions and/or deductions in the Contract.

P.7.1 Number and Description of Unit Prices:

		ADD	DEDUCT
1)	Opaque Wall per square foot vertical surface area	$_____	$_____
2)	Door and Frame per unit	$_____	$_____
3)	Per glazed opening		
	a. Operable Unit 10 to 20 s.f.	$_____	$_____
	b. Fixed Unit 10 to 20 s.f.	$_____	$_____
	c. Fixed Unit 20 to 40 s.f.	$_____	$_____

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bond and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.10 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions, and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1._____

2._____

3._____

P.11 (cont) c. ( ) Corporation, incorporated under the State Laws of _____.

P.12 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date _____

Firm Name _____

By _____

In the Presence of _____

Title _____

_____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the Proposal shall be declared irregular.)

GENERAL CONDITIONS

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GENERAL CONDITIONS

Article 1. Definitions

1.1 The Bidding Documents consist of the Proposal Forms, the General Conditions, the Supplementary General Conditions, the Notice to Bidders, the Drawings and Specifications.

1.2 The Contract Documents consist of the Proposal, the Agreement between Contractor and Owner, the General Conditions, the Supplementary General Conditions, the Notice to Bidders, the Drawings and Specifications, including all modifications thereof incorporated in the Documents before their execution. These form the Contract.

1.3 The term "sub-system" shall be understood to refer to an identifiable, generally complete pre-designed physically integrated, generally modular installed series of parts, which function as a unit within prescribed performance limits.

1.4 The terms "non-system" or "non-systems work" as used herein shall be understood to mean any work required to complete the buildings which is not included in the sub-systems work.

1.5 The term "Owner" or pronouns in the place of same as used herein shall be understood to refer to the Board of Education, City of Detroit, Mich.

1.6 The term "Architect" as used herein shall be understood to mean the Architect(s) employed by the Owner for a specific school forming part of the construction program and so identified on the Title Page of the specifications document.

1.7 The use of the word "Contractor" or "Sub-Systems Contractor," where used herein, shall mean the person, partnership, or firm to whom the Detroit Board of Education has awarded a specific sub-system contract.

1.8 The term "General Contractor" where used herein, or pronouns in the place of same, shall mean the Contractor to whom the Owner has awarded the General Contract for the construction of the school or schools specified in the construction program.

1.9 The use of the word "Subcontractor" in these Contract Documents refers to any person, firm, or corporation having a contract with the Contractor for a part of the work; and it includes one who furnishes material worked to a special design according to the plans or specifications of this work, but does not include one who merely furnished material not so worked.

1.10 The term "CSP Director," where used herein, shall mean the Technical Director of the Detroit Public Schools Construction Systems Program or such other representative of the Board of Education, City of Detroit, as may be appointed to succeed him.

1.11 The term "Inspector" where used herein shall mean the building inspector appointed by the Architects or Owners.

1.12 Written notice shall be deemed to have been served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.

1.13 The term "Work" of the Contractor or Subcontractors shall include labor or materials or both

1.14 All time limits stated in the Contract Documents are of the essence of the Contract.

1.15 The law of the place of building shall govern the construction of this Contract.

Article 2. Execution, Correlation and Intent of Documents

2.1 The Contract Documents shall be signed in duplicate by the Owner and the Contractor. In case either the Owner or Contractor or both fail to sign the General Conditions, Drawings or Specifications, the Architect shall identify them.

2.2 The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. The intention of the Documents is to include all labor and materials, equipment, and transportation necessary for the proper execution of the work. Materials or work described in words which so applies have a well-known, technical, or trade meaning shall be held to refer to such recognized standards.

2.3 The Contract Documents contemplate a finished piece of work of such character and quality as is reasonably inferable from them. It is not intended that work not covered under any heading, section, branch, class, or trade of the Contract Documents shall be supplied unless it is shown on the Drawings, is specified, or is inferable therefrom as being necessary to produce the intended results. Satisfactory interface of subsystems without additional work by the Owner is necessary and implicit.

2.4 The Specifications are separated into titled divisions for convenience of reference and to facilitate the letting of the Contract and subcontracts. Such separations shall not, however, operate to make the Architect an arbiter to establish limits to the contracts between the Contractor and any Subcontractor.

Article 3. Detail Drawings and Instructions

3.1 The Architect shall furnish, with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the work. All such drawings and instructions

shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom.

3.2 The work shall be executed in conformity therewith, and the Contractor shall do no work without proper drawings and instructions.

3.3 Immediately after being awarded the Contract, the Contractor shall prepare an estimated Progress Schedule and submit same for Architect's approval. It shall indicate the dates for the starting and completion of the various stages of construction.

Article 4. Reports of Building Operations

4.1 The Contractor shall furnish the Architect with written reports on forms provided by the Owner, giving the following information regarding the work:

.1 List of material delivered to the site.

.2 List of all material built in place.

.3 Statements giving the conditions, general progress of the work and the percentage of each branch of the work that has been finished, also parts which are completed within scheduled time and parts which are not finished according to schedule.

.4 Statements giving general progress of the work that is being done away from the site and approximate date when it will be finished and delivered.

Article 5. Copies Furnished

5.1 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the work.

5.2 Any additional copies of Drawings and Specifications required for the work may be obtained at cost of duplication.

Article 6. Schedule of Unit Prices

6.1 The Contractor shall furnish to the Architect, when directed, a complete detailed schedule of unit prices on which the Proposal is based.

6.2 The schedule shall be the basis of settlement for all payments on account, and for any additions, omissions, or alterations to the work which may be ordered by the Architect.

Article 7. Shop Drawings

7.1 The Contractor shall check and verify all field measurements and submit with such promptness as to cause no delay in his own work or in that of any sub-contractor, five copies of all shop or setting drawings and schedules required for the work of the various trades. All shop drawings shall be checked by the Contractor for coordination with other trades and general conformity to Contract Documents, dimensions, sizes, materials, and details before submission to the Architect for his approval. The Architect shall pass upon them with reasonable promptness, making desired corrections, including all necessary corrections relating to design and artistic effect. The Contractor shall make any corrections required by the Architect, file with him two corrected copies, and furnish such other copies as may be needed. The Architect's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called the Architect's attention to such deviations at the time of submission, and secured his written approval, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules.

7.2 The system of nomenclature for all work shown on the Architect's Drawings shall be followed on all shop drawings, with only such modifications or changes as may be approved by the Architect before they are made.

7.3 No shop drawing shall be allowed on the work unless same is marked as approved by the Architect.

Article 8. Drawings and Specifications on the Work

8.1 The Contractor shall keep on the site one copy of all Drawings and Specifications on the work, in good order, available to the Architect and to his representative.

Article 9. Ownership of Drawings

9.1 Any of the Drawings, Specifications, models, or any of the other Contract Documents and copies thereof furnished by the Architect are his property. They are not to be used on other work, and with the exception of the signed set of Contract Documents, are to be returned to him on request upon completion of the work.

Article 10. As-Built Drawings

10.1 The General Contractor shall be responsible for the preparation and furnishing of "As-Built" record prints including the work of each Subcontractor.

10.2 Prior to completion of the work, the Contractor shall purchase from the Architect two sets of current contract drawing prints for "As-Built" records. The General Contractor shall record, using colored pencil, in a neat, workmanlike manner, all cases where actual field construction differs from work as indicated on Contract Drawings. These "As-Built" drawings shall show all changes in details as well as changes in location and in elevation. Concealed work and utility locations shall be dimensioned. Shop drawings shall not be acceptable as "As-Built" record drawings.

Article 11. Samples

11.1 Where called for in the Specifications, or when required by the Architect, the Contractor shall submit samples of materials, appliances, finishes, or other items, included in the work. Such samples shall be approved by the Architect, in writing, before the work is executed. Work provided shall be equal to the approved samples. In case samples submitted are not approved by the Architect, others shall be submitted until satisfactory samples are approved.

11.2 Samples shall be submitted in ample time before the work is to be installed to permit sufficient time for the Architect's consideration of the samples submitted.

Article 12. Materials, Appliances, Employees

12.1 Unless otherwise stipulated, the Contractor shall provide and pay for all material, labor, tools, equipment, transportation, and other facilities necessary for the execution and completion of the work in his area of responsibility.

12.2 Unless otherwise specified, all materials shall be new; and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

12.3 Labor shall be performed in the best workmanlike manner by mechanics skilled in their respective trades. Standards of work required throughout shall be of the best grade of their respective kinds. The Contractor shall agree that none but competent workmen be employed.

Article 13. Approval of Materials

13.1 Where the Specifications give the Contractor the option of using one of several definitely-named makes or kinds of a particular item, or an "Approved Equal" item, the Contractor shall state what he proposes to use before making any provision for such and shall obtain

the Architect's written approval for the use of same, before the bidding due date.

13.2 Where the Specifications call for a definite kind, make, or type of material, proposals will be considered by the Architect for other kinds, makes, or types of materials, provided such proposals are submitted in writing, accompanied by sufficient description of such substitutions, one week in advance of the bidding due date; and the written approval of the Architect is obtained before the bidding due date.

Article 14. Interpretation and Precedence

14.1 Reference must be made to the Drawings for all measurements, together with the arrangement of rooms and general finish. Should it appear that work intended to be described, or any of the matters relative thereto, are not sufficiently detailed or explained on the Drawings or in the Specifications, the Contractor must apply to the Architect for such further Drawings necessary, and shall conform to the same so far as they may be consistent with the original drawings; and should any doubt or question arise in the true meaning of the Drawings and Specifications, reference shall be made to the Architect, whose decision thereon shall be final and conclusive. Work must not proceed if there is any uncertainty.

14.2 Where no dimensions or memoranda are given, the Drawings shall be accurately followed according to their several scales; but figures or memoranda shall take the precedence of scale measurements in all cases.

14.3 The Contractor and/or each Subcontractor shall view drawings and read complete specifications for all branches of work to be done on the building, in order to inform himself as to the work to be done by others and the full extent of his work and its connection therewith.

14.4 The Drawings and Specifications shall be deemed to explain each other. Should there, however, be any discrepancy between the Drawings and Specifications, or between the scale measurements of drawings and the figures on same, the latter in each case shall be followed; but any omissions from any Drawings or Specifications shall not govern what is shown on or called for by others.

Article 15. Dimensions, Measurements

15.1 The Drawings, together with the sizes given in the Specifications are understood to be the dimensions required in the construction of the work; but the Contractor and/or each Subcontractor, without extra compensation, shall make such changes as may be necessary to

bring the various parts and kind of work to fit each other in the very best manner, but no alterations shall be made without the advice and consent of the Architect.

15.2 Before ordering any material or doing any work, the Contractor and/or each Subcontractor shall verify all measurements at the building and be responsible for the correctness of same. No extra charge or compensation will be allowed due to a difference between actual dimensions and the measurements indicated on the Drawings. Any difference which may be found shall be submitted to the Architect for consideration before proceeding with the work.

Article 16. Royalties and Patents

16.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof.

Article 17. Surveys, Permits, Laws, and Regulations

17.1 The General Contractor shall employ a competent surveyor to correctly lay out the building with reference to existing property lines and grade levels, and who shall also establish a permanent bench mark at a suitable location to which all levels may be referred during the progress of the work. The General Contractor shall be held responsible for the accuracy of the surveyor's work.

17.2 Unless otherwise specified, each Contractor and/or Subcontractor shall lay out his own work and establish the necessary lines and levels for same, and be responsible for the correct installation of his work, in reference to existing conditions and the work of other Contractors.

17.3 The Architect will obtain, and the Owner will pay for, the general building permit required for the work. The Owner will pay for all costs involved in regard to the Public Lighting Commission hook up and the fire alarm hook up. All other necessary permits shall be obtained and paid for by the Sub-contractor who requires the same, and he shall give all legal notices and pay all fees required for the work.

17.4 The Contractor shall comply with all requirements of the official Building Code of the City of Detroit, and the laws, rules, and regulations of all municipal, county and state departments governing building construction and equipment.

17.5 If the work required by the Drawings and Specifications is above the standard required by the above-mentioned laws, regulations, etc., such shall be done as shown or specified.

Article 18. Protection of Work and Property

18.1 The Contractor shall continuously maintain adequate protection of all his work from damage, and shall further protect the Owner's property from injury arising in connection with this Contract; and he shall make good any damage or injury. He shall adequately protect adjacent property as provided by law and the Contract Documents.

18.2 The Contractor shall take all necessary precautions for the safety of employees on the work, and shall comply with all applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of workmen and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways, and falling materials; and he shall designate a responsible member of his organization on the work, whose duty shall be the prevention of accidents. The name and position of any person so designated shall be reported to the Architect by the Contractor.

18.3 In an emergency affecting the safety of life or of the work or of adjoining property, the Contractor, without special instruction or authorization from the Architect or Owner, is hereby permitted to act, at his discretion, to prevent such threatened loss or injury; and he shall so act, without appeal, if so authorized or instructed. Any compensation, claimed by the Contractor on account of emergency work, shall be determined by agreement.

18.4 The Contractor shall provide and maintain an approved method of protecting his work from damage due to weather conditions during all building operations, also including all required temporary enclosures, coverings, and other methods of protection, unless particularly specified otherwise in the Contract Documents. Methods of protection shall be subject at all times to the approval of the Architect.

18.5 The Contractor shall, within twenty-four (24) hours after receiving written notice from the Architect to that effect, proceed to remove from the grounds or building all materials condemned by him whether worked or unworked, or to take down all portions of the work which the Architect shall condemn as unsound or improper, or as in any way failing to conform to the Drawings or Specifications, and to the conditions of this Contract. The Contractor shall be responsible for all delays and damages caused by such removal of defective work.

18.6 The Contractor shall be held responsible for any damage to the building caused by an error in laying out his work or in fai

execution or by any defacement of work or any nuisance in or about the building caused by him or his employees.

18.7 The General Contractor shall provide approved thermometers, each having a maximum and minimum scale. During the progress of the work, set one thermometer outside of the building. From October 1 to May 1, set one thermometer in each enclosed story. Set the other thermometer where directed by the Architect.

18.8 Each day at noon, note the temperature on all thermometers, as well as the highest and lowest temperature for the last twenty-four hours, and then set thermometers. The temperature schedule shall be made out as directed by the Architect and a copy furnished to him.

18.9 The General Contractor shall exercise precaution for the protection of the glass under this Contract after it has been permanently installed in the building; and he will be held responsible for all breakage or other damage to glass up to the time the building is turned over to the Owner.

18.10 Where breakage or other damage is known to have been caused by any Subcontractor, the breakage or damage shall be made good to the satisfaction of the Architect by the Contractor and paid for by the Subcontractor responsible for the breakage or damage.

Article 19. Inspection of Work

19.1 The Architect and his representatives shall at all times have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

19.2 If the specifications, the Architect's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Architect timely notice of its readiness for inspection; and if the inspection is by another authority than the Architect, of the date fixed for such inspection, required certificates of Inspection being secured by the Contractor. Inspections by the Architect shall be promptly made, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Architect, it must, if required by the Architect, be uncovered for examination at the Contractor's expense.

19.3 Re-examination of questioned work may be ordered by the Architect; and if so ordered, the work must be uncovered by the Contractor. If such work be found in accordance with the Contract Documents, the Contractor shall pay such costs, unless it be found that the defect in the work was caused by a contractor employed as provided in the article on Separate Contracts; and in that event, the Owner shall pay such cost.

Article 20. Superintendence: Supervision

20.1 The General Contractor shall keep on his work, from the beginning of the work to the date of the final certificate as issued by the Architect, a competent superintendent and all necessary assistants, all satisfactory to the Architect. The superintendent shall not be changed except with the consent of the Architect, unless the superintendent proves to be unsatisfactory to the General Contractor and ceases to be in his employ.

20.2 The superintendent shall represent the General Contractor in his absence from the work, and all directions given to the superintendent by the Architect shall be as binding as if given to the General Contractor. Important directions shall be confirmed in writing to the General Contractor. Other directions shall be so confirmed on written request in each case.

20.3 The General Contractor shall give efficient supervision to the work, using his best skill and attention. He shall carefully study and compare all drawings, specifications, and other instructions, and shall report at once to the Architect any error, inconsistency, or omission which he may discover. He shall be actually present on the work during all regular and other working hours, except for such times as the Architect may approve that he leave the work temporarily on duty connected only with work under this Contract.

20.4 Meeting of the representatives of the various trades engaged upon the work shall be held, as directed by the Architect, for furthering the progress of the work. If representatives fail to attend these meetings or to carry out the orders issued, they shall, on request of the Architect, be immediately dismissed from the work and other representatives substituted.

Article 21. Owner's Inspector

21.1 The Owner reserves the right to maintain inspectors, in addition to the Architect's inspectors and superintendents, for the purpose of examining and testing materials, and for the inspection of the general character, methods, and progress of the work.

Article 22. Changes in the Work

22.1 Should changes be made on the Drawings or in the Specifications before a Contract is signed, such changes will be announced by the CSP Office to the intending bidders in the form of "Addenda," numbered consecutively, and dated at the time such changes are made. Each proposal shall state that all labor and materials required by such Addenda are included in the proposal, also giving the number and date of such Addenda.

22.2 Should changes be made on the Drawings or in the Specifications after a Contract is signed, such changes shall be made by the Contractor in accordance with "Bulletins," issued by the Architect or by the CSP Office and shall be governed by the General Conditions of the Contract.

22.3 It shall be understood and agreed by all parties submitting proposals on any part of the work that the requirements of all Contract Documents shall apply to all Addenda or Bulletins; and that unless otherwise mentioned therein, the general character of all work required by the same shall be as originally required for corresponding work, and that all incidental work necessitated shall also be included even though not particularly mentioned.

22.4 The Owner, without invalidating the Contract, may order extra work or make changes by altering, adding to, or deducting from the work, the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original Contract, except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

Article 23. Claims for Extra Cost

23.1 If the Contractor claims that any instructions by Drawings or otherwise involve extra cost under this Contract, he shall give the Architect written notice thereof within a reasonable time after the receipt of such instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property; and the procedure shall then be as provided for changes in the work. No such claim shall be valid unless so made.

Article 24. Deductions for Uncorrected Work

24.1 If the Architect and Owner deem it inexpedient to correct work injured or done not in accordance with the Contract, an equitable deduction from the Contract price shall be made therefor.

Article 25. Delays and Extension of Time

25.1 If the Contractor should be delayed at any time in the progress of the work by any act or neglect of the Owner or by the Architect or of any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the work or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the Architect pending arbitration, or by any cause which the Architect shall decide to justify the delay,

then the time of completion shall be extended for such reasonable time as the Architect or the CSP Office may decide.

25.2 No such extension shall be made for delay occurring more than seven days before claim thereof is made in writing to the Architect. In the case of a continuing cause of delay, only one claim is necessary.

25.3 If no schedule or agreement stating the dates upon which drawings shall be furnished is made, then no claim for delay shall be allowed on account of failure to furnish Drawings until two weeks after demand for such Drawings and not then unless such claim be reasonable.

25.4 This article does not exclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

Article 26. Acceleration of Work

26.1 If, in the judgement of the Architect, it becomes necessary at any time during the progress of the work in order to accelerate the work of any Subcontractor, each Subcontractor, when so directed by the Architect, shall cease work at any point and transfer his men to such other points as may be required, and shall execute such portions of his work as may be necessary to promote the progress of the work as a whole and to enable other Subcontractors to hasten, properly engage, and carry on their work. If necessary, Subcontractors shall temporarily omit such portions of the work as may be necessary for the advancement of the work of other contractors, and shall go back thereafter and execute the work left out at such time as the Architect directs. All expenses involved in such transfer or going back must be borne by the Subcontractor involved.

Article 27. Correction of Work Before Final Payment

27.1 The Contractor shall promptly remove from the premises all work condemned by the Architect as failing to conform to the Contract, whether incorporated or not; and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of Subcontractors or other contractors destroyed or damaged by such removal or replacement.

27.2 If the Contractor does not remove such condemned work within a reasonable time, fixed by written notice, the Owner may remove it and may store the material at the expense of the Contractor. If the Contractor does not pay the expense for such removal within ten days' time thereafter, the Owner may, upon ten days' written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

Article 28. Correction of Work After the Final Payment, Guarantees

28.1 Neither the final certificate, nor payment on account in full, nor any provision in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or workmanship; and he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of final certificate on this Contract. Furnish written guarantee.

28.2 Certain branches, divisions, or items shall be guaranteed for periods other than as above mentioned, and are particularly so stated in the following specifications under the various trades.

28.3 Defects appearing during the period of guarantee shall be made good by the Contractor at his own expense upon demand by the Owner.

28.4 Where guarantees are especially called for in the specifications of the various trades, the Subcontractor involved shall submit to the Architect, when required, a guarantee made in the following form, having all spaces properly filled in to conform with the requirements. In case more than one guarantee is required in any one trade, each guarantee shall be made separately.

GUARANTEE

Date_____

The undersigned herewith guarantee that the work installed under his Contract is in accordance with the requirements set forth in the specifications for same as prepared by the Architect.

Contract for _____

(Signed) Subcontractor _____

Contractor _____

Article 29. Owner's Right to do Work

29.1 If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the Owner, after three days' written notice to the Contractor, may, without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor provided, however, that the Architect shall approve both such action and the amount charged to the Contractor.

Article 30. Owner's Right to Terminate Contract

30.1 If the Contractor should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to Subcontractors or for material or labor, or persistently disregard laws, ordinances, or the instructions of the Architect, or otherwise be guilty of a substantial violation of any provision of the Contract, then the Owner, upon the certificate of the Architect that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor seven days' written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price shall exceed the expense of finishing the work including compensation for additional architectural, managerial, and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Architect.

Article 31. Application for Payment

31.1 The Contractor shall, before the first application on each individual building, submit to the General Contractor a schedule of values of the various parts of the work in accordance with the unit cost sheets, including quantities aggregating the total sum of the part of the Contract for the specific building, divided so as to facilitate payments to Sub-Contractors made out in such form as the General Contractor and the Contractor may agree upon and, if required, supported by such evidence as to its correctness as the General Contractor may designate. Such schedules shall be used as a basis for applications for payment by the General Contractor and when agreed to by the Architect, shall be used as a basis for certificates of payment unless it is found to be in error. Payment will be made directly by the Owner to the Contractor from the certificate of payment.

31.2 In applying for a payment, the Contractor shall submit a statement based upon this schedule which, if required, shall be itemized in such form and supported by such evidence as the Architect may direct showing his right to payment claimed. If payments are made on account of materials delivered and suitably stored at the site, but not incorporated in the work, the Contractor may be required to furnish Bills of Sale or other procedure as will establish the Owner's title

to such material or otherwise adequately protect the Owner's interest. Materials upon which an estimate has been based shall not be removed from the building or premises except with the written consent of the Architect.

Article 32. Certificates for Payment

32.1 If the Contractor has made application for payment as above, the General Contractor shall within five (5) working days issue an application for payment to the Architect who shall within five (5) working days of the receipt of an application for payment, certify the account for payment or advise the General Contractor and the Contractor promptly in writing why the account is amended or disapproved. Such certificates may provide for holdbacks sufficient to protect the Owner against all liens of which he has notice and in accordance with the laws of the state of Michigan.

32.2 The Owner shall, within five (5) working days of the Architect's certificate, make payment on the account in accordance with the Agreement. No more than one working day shall be allowed for transmission of certificates or payments between each of the parties.

32.3 No payment made to the Contractor and no partial or entire use or occupancy by the Owner shall be construed as an acceptance of any work or material not in accordance with this Contract. Issuance of the final certificate shall constitute a waiver of all claims by the Owner, otherwise than under Article 28 of these Conditions, and the acceptance of such final certificate by the Contractor shall constitute a waiver by him of all claims except those previously made and still unsettled, if any.

32.4 Should the Owner fail to pay the sum named in any certificate of the Architect or in any award by Arbitration, upon demand when due, the Contractor shall receive, in addition to the sum named in the certificate, interest thereon at the then current prime bank lending rate.

Article 33. Payments Withheld

33.1 The Architect may withhold or, on account of subsequently discovered evidence, nullify the whole or part in any certificate to such extent as may be necessary to protect the Owner from loss on account of:

.1 Defective work not remedied.

.2 Claims filed, or reasonable evidence indicating probable filing of claims.

.3 Failure of the Contractor to make payments promptly to Subcontractors or for material or labor.

.4 A reasonable doubt that the Contract can be completed for the balance then unpaid.

.5 Damage to another Contract.

33.2 When the above grounds are removed, payment will be made for accounts withheld because of them.

Article 34. Guaranty Bonds

34.1 See Notice to Bidders.

Article 35. Damages

35.1 Should either party to this Contract suffer damages because of any wrongful act or neglect of the other party or of anyone employed by him, claim shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the final payment, except as expressly stipulated otherwise in the case of faulty work or materials.

35.2 Should the Contractor claim damages on account of the delay, negligence, or carelessness of a Subcontractor or another contractor, or for any cause of dispute, he shall report the occurance of such damage or dispute in writing within five days of such occurance to the Architect and to the alleged party at fault. In case such report is not made, the Contractor whose work is injured shall be held responsible for the making good of such damages.

35.3 The decision of the Architect and Engineer jointly in all such disputes shall be final.

Article 36. Liens

36.1 Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information, the releases and receipts include all the labor and materials for which a lien could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner, to identify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

Article 37. Assignment

37.1 Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Owner.

Article 38. Separate Contracts

38.1 The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their material and the execution of their work and shall properly connect and coordinate his work with theirs.

38.2 If any part of the Contractor's work depends for proper execution, or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the Architect any defect in such work that may render it unsuitable for such proper execution and results. His failure so to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work, except as to defects which may develop in the other contractor's work after the execution of his work.

38.3 To insure proper execution of his subsequent work, the Contractor shall measure work already in place and shall at once report to the Architect any discrepancy between the executed work and the drawings.

Article 39. Installation of Owner's Equipment

39.1 The Contractor agrees to permit the Owner to place and install his own equipment during progress of the work as he will not impede the Contractor's progress, before the completion and acceptance of the various parts of the work. The Contractor further agrees that such placing and installation of equipment and machinery does not in any way evidence the completion of the work or any portion of it, nor signify the Owner's acceptance of the work nor any part of it.

Article 40. Subcontracts

40.1 Prior to the formal awarding of the Contract, the Contractor shall submit a list of Subcontractors proposed for the principal parts of the work and for such other parts as the Owner and the Architect may request, and shall not employ any to whom the Owner and the Architect may have a reasonable objection.

40.2 The Contractor agrees that he is as fully responsible to the Owner for the acts and omissions of his Subcontractors and of persons either

directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

40.3 Nothing in the Contract Documents shall create any contractual relation between the Owner and any Subcontractor.

Article 41. Relations of Contractor and Subcontractor

41.1 The Contractor agrees to bind every Subcontractor and every Subcontractor agrees to be bound by the terms of the Agreement, the General Conditions of the Contract, the Supplementary General Conditions, the Drawings and Specifications as far as applicable to his work, including the following provisions of this article, unless specifically noted to the contrary in a subcontract approved in writing as adequate by the Owner or Architect.

41.2 The Subcontractor agrees:

.1 To be bound to the Contractor by the terms of the Agreement, General Conditions of the Contract, the Supplementary General Conditions, Drawings and Specifications, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the Owner.

.2 To submit to the Contractor applications for payment in such reasonable time as to enable the Contractor to apply for payment under Article 31 of the General Conditions.

.3 To make all claims for extras, for extensions of time, and for damages for delays or otherwise, to the Contractor in the manner provided in the General Conditions of the Contract, and the Supplementary General Conditions, for like claims by the Contractor upon the Owner, except that the time for making claims for extra cost is one week.

41.3 The Contractor agrees:

.1 To be bound to the Subcontractor by all the obligations that the Owner assumes to the Contractor under the Agreement, General Conditions of the Contract, the Supplementary General Conditions, Drawings and Specifications, and by all the provisions thereof affording remedies and redress to the Contractor from the Owner.

.2 To pay the Subcontractor, within five (5) days from the receipt of the payment of the certificates, if issued under the schedule of values described in Article 31 of the General Conditions, the amount allowed to the Contractor on account of the Subcontractor's work to the extent of the Subcontractor's interest therein.

.3 To pay the Subcontractor, upon the payment of certificates, if issued

otherwise than as in Article 41.3.2., so that at all times his total payments shall be as large in proportion to the value of the work done by him as the total amount certified to the Contractor is to the value of the work done by him.

.4 To pay the Subcontractor to such extent as may be provided by the Contract Documents or the Subcontract, if either of these provides for earlier or larger payments than the above.

.5 To pay the Subcontractor on demand for his work or materials as far as executed and fixed in place, less the retained percentage, at the time the certificate should issue, even though the Architect fails to issue it for any cause not the fault of the Subcontractor.

.6 To pay the Subcontractor a just share of any fire insurance money received by him, under the Supplementary General Conditions.

.7 To make no demand for liquidated damages or penalty for delay in any sum in excess of subh amount as may be specifically named in the Subcontract.

.8 That no claim for services rendered or materials furnished by the Contractor to the Subcontractor shall be valid unless written notice thereof is given by the Contractor to the Subcontractor during the first ten days of the calendar month following that in which the claim originated.

41.4 Nothing in this article shall create any obligation on the part of the Owner to pay or to see to the payment of any sums to any Subcontractor.

Article 42. The Architect's Status

42.1 The Architect shall have general supervision and direction of the work. He is the agent of the Owner only to the extent provided in the Contract Documents and when in special instances he is authorized by the Owner so to act; and in such instances he shall, upon request, show the Contractor written authority. He has authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the Contract.

42.2 As the Architect is, in the first instance, the interpreter of the conditions of the Contract and the judge of its performance, he shall side neither with the Owner nor with the Contractor, but shall use his power under the Contract to enforce its faithful performance by both.

42.3 In case of the termination of the employment of the Architect, the Owner shall appoint a capable and reputable architect, whose status under the Contract shall be that of the former Architect.

Article 43. The Architect's Decisions

43.1 The Architect shall, within a reasonable time, make decisions on all claims of the Owner or Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the Contract Documents.

43.2 The Architect's decisions, in matters relating to artistic effect, shall be final, if within the terms of the Contract Documents.

Article 44. Cash Allowances

44.1 The Contractor shall include in the Contract sum all allowances named in the Contract Documents and shall cause the work so covered to be done by such Subcontractors and for such sums as the Architect may direct, the Contract sum being adjusted in conformity therewith. The Contractor declares that the Contract sum includes such sums for expenses and profit on account of cash allowances as he deems proper. No demand for expense or profit other than those included in the Contract sum shall be allowed. The Contractor shall not be required to employ for any such work persons against whom he has a reasonable objection.

Article 45. Use of Premises, Storage of Materials

45.1 The Contractor shall confine his apparatus, the storage of materials, and the operations of his workmen to limits indicated by law, ordinances, permits, or directions of the Architect and shall not unreasonably encumber the premises with his materials.

45.2 The Contractor shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.

45.3 The Contractor shall enforce the Architect's instructions regarding signs, advertisements, fires, and smoking.

45.4 The Contractor shall be responsible for the proper care and protection of all of the materials, equipment, etc., delivered at the site. Building materials, equipment, etc., may be stored on the premises, subject to the approval of the Architect.

45.5 When any space in the building is used as a shop or storeroom, the one making use of such room will be held responsible for any repairs, patching, or cleaning arising from such use.

45.6 Each Contractor shall protect and be responsible for any damage to his work or material, and shall make good without costs to the Owner any damage or loss that may occur, unless particularly otherwise stipulated in the Contract Documents.

45.7 Each Contractor shall be responsible for his own material upon the grounds or upon the streets, and must place red lights upon it at night, and shall also guard the public against all damages by reason of pits or excavations, or because of any piles of materials about the premises, and shall be liable for any damages occuring because of any neglect to provide such safeguard. No Contractor shall occupy any unnecessary amount of space with his material; and each shall obey the instructions of the Superintendent, who will see that a fair apportionment of the building ground is made among the several Contractors.

SUPPLEMENTARY GENERAL CONDITIONS

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SUPPLEMENTARY GENERAL CONDITIONS

Article 1. Scope

1.1 The work provisioned within these Contract Documents includes all labor, material, equipment, and services required to complete a particular sub-system as indicated on the drawings and as specified herein; including all necessary work incidental as complementary thereto.

Article 2. Work Not Included

2.1 The following items of work are not included in the work covered by this Contract:

.1 Items marked "N.I.C." or "Non-Systems" on the drawings

.2 Movable furnishings except those particularly specified or indicated on the drawings.

Article 3. Contract

3.1 The form of contract or agreement which the successful bidders will be required to sign is on file in the Business Office of the Detroit Public Schools and is hereby referred to, incorporated herein and made a part of these Supplementary General Conditions.

Article 4. Utilities

4.1 The General Contractor will provide and pay for all water, gas, light, power, and other facilities necessary for the execution and completion of the work at the sites.

Article 5. Owner's Use of Premises

5.1 The Owner reserves the right to negotiate with the Contractor to occupy the building or any portion thereof before same has been finally completed and accepted, it being mutually understood and agreed that such occupancy does not relieve the Contractor from completing his work or obligations within the time specified.

5.2 The Owner will occupy the present building during the progress of the work under this Contract. The Contractor shall cooperate with the Owner in such manner that the progress of the work will not interfere with the Owner's use of the building or as directed by the Architect.

Article 6. Taxes

6.1 The work under this Contract is exempt from local use and sales taxes, but all other applicable taxes shall be paid by the Contractor.

Article 7. Sub-System Interface

7.1 The Contractor shall work to the agreed interface requirements with all Sub-System Contractors whose work is adjacent.

7.2 If agreed tolerances or variances are not met, the Contractor whose work is at fault shall make it right without delay, including three shift work if required. The Contractor whose work depends upon the corrected Sub-System shall not commence work until he is satisfied with the interface condition.

7.3 Mandatory interfaces in the First CSP Building System shall be:

Sub-System Bidder	Mandatory Interface with Sub-System
No. 1	2, 3, 4, 5
No. 2	1, 3, 4, 5
No. 3	1, 2, 4, 5
No. 4	1, 2, 3, 5
No. 5	1, 2, 3, 4

Article 8. Identification of Subcontractors

8.1 The name and location of the place of business of each Subcontractor who will perform work or labor or render service to the Contractor shall be included with the Bid.

Article 9. Coordination

9.1 During the bidding period the Contractor shall coordinate all sub-components with each other and this Sub-System with all other interface Sub-Systems. During this period, the CSP Director will assist and/or monitor the coordination between the various Sub-System bidders. The CSP Director with his Consultants will be the interpreter of the performance requirements and the solutions.

Article 10. CSP Director's Decisions

10.1 The CSP Director shall decide on questions arising under the Contract Documents for sub-systems work whether as to the performance of the work or the interpretation of the Specifications. Should the Contractor hold such decisions to be at variance with the Contract Documents, or to involve changes in work already built, fixed, ordered or in hand, in excess of the Contract, or to be given in error, he shall so notify the CSP Director before proceeding to carry them out.

Article 10. CSP Director's Decisions (continued)

10.2 In the event of the CSP Director and the Contractor failing to agree as to such excess or error, and the CSP Director deciding that such disputed work shall be carried out, the Contractor shall act according to such decision. Any question of excess of cost due to the aforesaid cause may be decided in the manner hereinafter provided in Article 15 of the Supplementary General Conditions.

10.3 The Owner, through the CSP Director, shall have the power to cause any part or all of the work to be prosecuted with greater diligence when it has been delayed or stopped.

Article 11. Inspection of the Work of Other Contractors

11.1 It shall be the duty of the Contractor, before beginning any of his work, to examine all construction and work of other contractors that may affect his work, and to satisfy himself that everything is in proper condition to receive his work, and he shall notify the General Contractor in writing of any exception that he may take to the construction of the other contractors. Failure on his part so to do shall constitute acceptance of the construction as suitable in all ways to receive his work, except as to the defects that may develop in the other contractor's work after the execution of his own work.

11.2 In order that this work shall not be delayed, the General Contractor will notify Contractors in ample time to furnish and set in place such portions of their work as is wholly or in part embedded, built-in, attached to, or supported by, the work being executed by him and/or other Contractors. Any cutting or patching made necessary by failure or delay on his part to comply with this injunction shall be done at his own expense.

Article 12. Cooperation

12.1 The General Contractor and all Contractors shall coordinate their work with all adjacent work and shall cooperate with all other trades so as to facilitate general progress of work. Each trade shall afford all other trades every reasonable opportunity for installation of their work and for storage of their material.

Article 13. Shop Drawings

13.1 The use of the CSP Building System will reduce the need for shop drawings. If shop drawings are still required, the following regulations shall be complied with:

13.2 The Contractor shall submit for approval of the Architect, shop and setting drawings and schedules required by the Specifications or that may be requested by the Architect, and no work shall be subrogated by the Contractor save at his own risk and until such approval has been given.

Article 13. Shop Drawings (continued)

13.3 Six copies of all drawings, equipment lists, and schedules shall be submitted (unless otherwise specified) through the General Contractor, accompanied by a letter of transmittal which shall give a list of numbers and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.

13.4 The Contractor shall submit all drawings and equipment lists and schedules sufficiently in advance of the construction requirements to allow ample time for checking, correcting, resubmitting, and re-checking.

13.5 The drawings, equipment lists, or schedules submitted shall be marked with the name of the project, numbered consecutively, and bear the following stamp of approval of the Contractor as evidence that the drawings have been checked by him:

"I certify that I have checked this submittal and that it complies with all the requirements of the original performance specifications, and the drawings and specifications.

Signed by_____
(Contractor)

Date_____."

Any drawing submitted without this stamp of approval will not be considered or reviewed, and will be returned to the Contractor for resubmission. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal, in order that, if acceptable, suitable action may be taken for proper adjustment. Otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract Documents.

13.6 If a drawing, equipment list, or schedule as submitted indicated a departure from the contract requirements which the Architect finds to be in the interests of the Owner and so minor as not to involve a change in the contract price, or time for performance, he may approve the drawing.

13.7 The approval of shop or setting drawings, equipment lists, and schedules will be general and, except as otherwise provided in paragraph 13.6 above, shall not be construed as:

.1 permitting any departure from the Contract requirements;

.2 relieving the Contractor from the responsibility for any error in detail, dimensions, or otherwise that may exist;

.3 approving departure from additional details or instructions previously furnished by the Architect, which are not inconsistent with the Contract.

Article 14. Materials Tests

14.1 Specific test requirements are outlined in the individual Sub-System Performance Specifications. All materials and Sub-Systems shall have a demonstrated ability to meet the requirements. Testing or examination and consideration during the bidding period is required for those Sub-Systems proposing something innovative or different from standard traditional building practice as established by the CSP Director. When graphic evidence of successful interface between adjacent ub-Systems is insufficient, mock-up testing may be required. Sub-Systems using traditional methods and techniques may not need specific test results, subject to written acceptability of their Sub-Systems by the authorities having jurisdiction.

14.2 Production unit testing as required by the Architect and/or the Administrative Authority having jurisdiction shall be done by an independent testing and inspection organization appointed by the Architect and paid for by the Owner. The tested specimens will be required to meet the standards established by the Sub-Systems Contractor during the bid period. Should production units fail to meet the standards established, reworking of the Sub-System and retesting shall be done at the Contractor's expense until such time as production units meet the standards established.

14.3 Tests and inspections shall be made in accordance with the applicable standard methods of the A.S.T.M. or other procedures designated herein. The testing laboratory shall be as selected by the Architect, subject to the approval of the Owner. The Architect will furnish the testing laboratory with a list of the tests and inspections required. Unless otherwise specified, the testing laboratory shall send copies of all test reports simultaneously to the Owner, the Architect, and the Contractor. The written reports shall state that the tests were made under the responsible charge of a Testing Engineer; that the material was tested in accordance with the provisions of these specifications; and that the material tested met or failed to meet the requirements of these specifications. Materials furnished for the Contract shall be equal to approved samples in every respect. Samples after testing will remain the property of the Sub-System Contractor, but will be impounded until completion of the Work.

Article 15. Arbitration

15.1 In the case of any dispute arising between the Owner (or the CSP Director or Architect acting for the Owner) and the Contractor as to their respective rights and obligations under the Contract, either party hereto shall be entitled to give the other notice of such dispute and to request arbitration thereof; and the parties may, with respect to the particular matters then in dispute, agree to submit the same to arbitration in accordance with the applicable laws of the State of Michigan.

Article 15. Arbitration (continued)

15.2 Arbitration proceedings shall not take place until after the completion or alleged completion of the work except (a) on a question of certificate for payment, or (b) in a case where either party can show that the matter in dispute is of such a nature as to require immediate consideration while evidence is available.

Article 16. Conferences

16.1 At any time during the progress of the work the Owner or the Architect shall have authority to require a representative of the Contractor empowered to act with regard to the work, to attend a conference of any or all of the Contractors engaged on the work, and any notice of such conference shall be fully observed and complied with by a Contractor. (It is anticipated that there will be at least one such conference per month during the execution of the work of any building.)

Article 17. Contractor's Right to Suspend Work or Terminate Contract

17.1 If the work should be stopped under an order of any court, or public authority through no act or fault of the Contractor, or of anyone employed by him, or if the Architect fails to issue a certificate in accordance with Article 32 of the General Conditions, or if the Owner should fail to pay to the Contractor within seven (7) working days of its maturing and presentation, any sum certified by the Architect or awarded by arbitrators, then the Contractor may, upon five (5) working days' written notice to the Owner and the Architect, stop work, and/or terminate this Contract without prejudice to any other right or remedy he may have, and recover from the Owner payment for all work executed and any loss sustained, upon plant or material, with reasonable profit and damages.

Article 18. Care of Present Buildings and Site

18.1 The Contractor shall be held responsible for the care and preservation of the present building, if any, of premises and of adjacent premises and coterminous property. Any parts of them injured, damaged or disturbed because of his work shall be repaired, replaced or cleaned by him at his expense.

Article 19. Maintenance of Existing Structures and Conduits

19.1 The removal and/or replacing of any existing structures, pipes, conduits, pavement or other material necessary for the proper completion of any work herein specified will be performed by the General Contractor. The right is reserved to the District and to gas, water, telephone, telegraph and electrical power transmission companies to enter upon the work for the purpose of making repairs and changes that have become necessary by reason of the work specified herein.

Article 20. Removal of Rubbish, Cleaning, Etc.

20.1 From time to time, and as directed by the General Contractor, the Sub-Systems Contractor shall clean the building, windows, premises, streets and adjacent property of accumulated rubbish, debris, unnecessary appliances or any other unused rubbish or materials which may constitute an obstruction to the progress or completion of the work, wherever materials or obstruction were caused by his work. At the completion of the work, and as one of the requisites thereof, the Sub-Systems Contractor shall remove from the building, premises, sidewalks, streets and adjacent premises any and all tools, appliances, rubbish, packing or debris of any kind contributed by his work; he shall go over all of his work and put the same in perfect order and condition; and shall repair or replace all damaged, broken or stained parts of his work, whether so injured by his workmen or by anybody else.

Article 21. Cutting, Patching, and Alterations

21.1 The Contractor and each Subcontractor shall do all cutting, patching, or fitting of his work that may be required to make its several parts come together properly and fit it to receive, or be received by, the work of other trades as required. Any cost caused by defective or ill-timed work shall be borne by the party responsible therefor. The Contractor and/or each Subcontractor shall not endanger any work by cutting, excavating, or otherwise altering the work, nor shall he cut or alter the work of another Subcontractor without approval of the Architect. Patching of any work shall be done by the party responsible for the work affected, but the cost of such patching shall be at the expense of the party causing said work unless otherwise stipulated.

21.2 Certain work in connection with the existing buildings shall be provided throughout the various trades of the work in this Contract, as shown on the drawings or herein specified, and as necessary for a completed condition, unless particularly otherwise stipulated in the Contract Documents. Work to be done about the existing buildings shall also include the removal, readjustment, and repairing of present work in connection with such work as required. Existing services which are to remain shall be protected and maintained wherever encountered including any temporary or permanent rerouting as may be required.

Article 22. Moving Materials

22.1 Should it become necessary at any time during the course of the work to move stored materials which are to be used in the construction or equipment which has been temporarily placed, then the Contractor or the Subcontractor furnishing such material or equipment shall, when so directed by the Architect, move them or cause them to be moved without additional charge.

Article 23. Fire Prevention

23.1 The General Contractors and all Sub-System Contractors shall observe all provisions of the specifications relative to fire prevention throughout the construction period. In carrying out these provisions, they shall observe the following requirements.

23.2 Tarpaulins used for temporary enclosures or for night or weather protection of masonry walls shall be flameproofed by an approved process before delivery to the jobsite, and shall be reprocessed during the progress of the work if required.

23.3 Where possible, storage of large quantities of flammable materials at the site shall be avoided. Materials for roofing shall be raised to roofs only in such quantities as needed for immediate use. Limited storage for flammable materials inside the building and the mixing of same shall be permitted only in masonry or concrete enclosed rooms. Empty containers for such materials and all oily or paint-soaked rags shall be removed from the building at the close of each day's work.

23.4 Welding and flame cutting equipment shall be of approved type and shall be used only in such spaces and at such times as approved by the Architect. The Contractor shall provide special fire watchers while welding or cutting, and have water or fire extinguishers available for immediate use. Burners and torches using gasoline shall not be used on the premises.

23.5 Smoking shall be prohibited in portions of the building where flammable material is being installed or stored. Other portions of the construction may be designated by the Architect as "No Smoking" areas where so posted, and the Contractor shall be responsible for enforcement of such designation.

23.6 Temporary heating equipment shall be of approved type, fired by oil or gas burners. Use of any high-flash fuels shall be avoided. Provide required bases, shields, etc., under and around heaters to prevent too rapid drying of adjacent concrete or masonry. Competent watchmen shall be provided in such heated areas at all times when such temporary equipment is in operation.

23.7 The General Contractor shall provide at least two fire extinguishers at proper locations on every floor of the building and in all temporary buildings. Extinguishers shall be of approved manufacture and capacity, shall be pre-tested and recorded, and shall be of soda-and-acid type for use on general rubbish, and CO_2 or dry chemical type for use on oily materials or electrical equipment.

23.8 Gasoline shall not be used as a fuel at any time.

Article 24. Contractual Liability

24.1 The Contractor shall pay, indemnify, and hold the Owner harmless for and against all damages, costs, and expenses which the Owner may suffer or may come to arise from any act done or suffered by the Contractor or any of his agents, Subcontractors, or employees, or of any neglect, default or omission by the Contractor, his agents, Subcontractors, or employees to do or perform any act or duty imposed upon them by the Contract Documents or by law.

Article 25. Insurance - General Requirements

25.1 The Sub-System Contractor shall not commence work under this Contract until all insurance as required by the paragraphs to follow has been obtained and approval given by the Owner, nor shall the Sub-System Contractor allow any Subcontractor to commence work on his subcontract until similar insurance required of the Subcontractor has also been obtained and approved. Certificates of Insurance including ten day cancellation notice provisions shall be furnished the Owner by the Sub-System Contractor in every instance.

Article 26. Contractor's Liability Insurance

26.1 The Contractor shall maintain such insurance coverage as will protect him from claims under workmen's compensation acts and from any other claims for damages due to personal injury, including death, and from claims for damages to property, which may arise from operations under this Contract, whether such operations be by the Contractor himself, or by Subcontractors, or by anyone directly or indirectly employed by them. Adequacy of such protection shall be subject to the Owner's approval, and sufficient copies of insurance certificates shall be filed with the Owner through the Architect.

26.2 Liability insurance shall be under the comprehensive general and automobile bodily injury and property damage form of policy written, unless otherwise directed, in the following limits:

Bodily Injury - One Person	$100,000
- Each Accident or Occurrence . . .	$300,000
Property Damage	$250,000

26.3 Contractor's liability insurance shall not be terminated or altered without written consent of the Owner.

Article 27. Owner's Liability Insurance

27.1 The Owner may at his option maintain such additional insurance as will protect him from any liability to others for damages arising from operations under this Contract.

Article 28. Fire Insurance with Extended Coverage

28.1 The General Contractor shall effect and maintain fire insurance with extended coverage upon the entire structure on which the work of this Contract is to be done to the extent of one hundred per cent (100%) of the insurable value thereof including all items of work in, or adjacent to, the insured structure if such items are included in the cost of the work, excluding mechanic's tools, equipment, scaffolding, and other such items where capital value is not included in the cost of the work. Any loss under said coverage is to be made adjustable with payment to the Owner as Trustee for the insureds and the Contractor and Subcontractor as their interests may appear. Insurance coverage shall not be altered or terminated without knowledge of the insured parties.

Article 29. Employee Non-discrimination

29.1 During the performance of this Contract, the Contractor agrees as follows:

.1 The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this non-discrimination clause.

.2 The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

.3 The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the said labor union or workers' representative of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

Article 29. Employee Non-discrimination (continued)

29.1 (cont) .4 The Contractor will furnish all information and reports as requested by the Board of Education of the City of Detroit in accordance with its policy(ies) of non-discrimination, and will permit access to his books, records, and accounts by the duly authorized representatives of the Board of Education for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

.5 In the event of a Contractor's non-compliance with the non-discrimination clauses of this Contract or with any of the said policies, this Contract may be cancelled, terminated, or suspended in whole or in part; and the Contractor may be declared ineligible for further Board of Education contracts in accordance with procedures established by the Board of Education of the City of Detroit, and such other sanctions may be imposed and remedies invoked as provided by rule, regulation, order, or statement of policy of the Board of Education, or as otherwise provided by law.

.6 The Contractor will include the provisions of paragraphs (.1) through (.6) in every subcontract or purchase order unless exempted in writing by a duly authorized agent of the Board of Education of the City of Detroit in such fashion that such provisions will be legally binding upon Subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order, or other memorandum of contractual relationship, as the Board of Education may direct as a means of enforcing such provisions, including sanctions for non-compliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the Board of Education, the Contractor may request the Board of Education of the City of Detroit to enter into such litigation to protect the interest of the said Board of Education.

SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 1 - STRUCTURE

C O N T E N T S

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SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 1 - STRUCTURE

1.1 CONTRACT DOCUMENTS

Parts I, II and III are part of this specification.

1.2 SCOPE

1.2.1 Work Included

1.2.1.1 A complete Structure Sub-System including:

- floor and roof deck elements,
- secondary and primary spanning members,
- columns including base plates,
- supply and layout information of anchor bolts with supervision and inspection of setting,
- wind bracing and the provision for the concealment of same.
- fireproofing as required, integrated with the structural components, except where other Sub-Systems specially designed and constructed provide fireproofing,
- special conditions such as expansion joints, changes in floor and roof levels, floors as temporary roofs, setbacks in vertical skins, support of permanent walls, future extension of horizontal spanning members and columns and their connections,
- prime coat painting and field touch-up,
- grouting of base plates.

1.2.1.2 Roofing and Stairs (Item 1.4.6) as part of this Sub-System are optional.

1.2.2 Work Excluded from this Sub-System

1.2.2.1 Non-system work such as foundations, slabs on grade, bearing walls, stairs, cantilevered floor or roof elements, inside and outside structural elements such as canopies, loose lintels.

1.2.2.2 Structural elements forming part of other Sub-Systems such as lateral bracing, tracks and supporting frames for operable partitions, and hangers for ceilings.

1.2.2.3 Provisions to connect elements not forming parts of a Sub-System.

1.2.2.4 Setting of anchor bolts.

1.2.2.5 Site preparation for the access and movements of erection equipment including ramping and shoring of suspended non-system floor areas at grade level.

1.3 DEFINITIONS

1.3.1 "Engineer"

- the Consulting Structural Engineer retained for the design of the individual school.

1.3.2 "Roof Deck"

- a complete structural element between secondary spanning members supporting live loads, insulation, roofing, ceiling and nominal loads from mechanical and electrical services.

1.3.3 "Floor Deck"

- a complete structural element between secondary spanning members supporting live loads, partition loads, ceilings, and nominal loads from mechanical and electrical services.

1.3.4 "Secondary Spanning Member"

- a structural member carrying vertical loads from the floor deck elements, roof deck elements, the Vertical Skin and in isolated cases, special loads to columns or to primary spanning members.

1.3 DEFINITIONS (Continued)

1.3.5 "Primary Spanning Member"

- a structural member carrying vertical reactions from secondary spanning member, loads from the Vertical Skin and occasional special loads to columns.

1.3.6 "D.B.C."

The City of Detroit Building Code.

1.4 COMPONENTS

1.4.1 Floors and Roofs

1.4.1.1 The floors shall be monolithic or composed of flat elements without steps or ridges, joined to safely transfer all horizontal and vertical forces. The finished floors shall be smooth and suitable to receive floor covering materials. The finished surface shall be equivalent to a steel trowel finish of a concrete topping having a minimum ultimate compressive strength of 2500 psi at 28 days. Special finishes may be required in some areas. These finishes shall be non-system.

1.4.1.2 Roof surfaces shall be suitable to receive the insulation and roofing.

1.4.2 Finishes

1.4.2.1 The surfaces of the components in the finished structure shall conform to the following minimum finishing requirements.

1.4.2.2 Surfaces not architecturally exposed:

1.4.2.2.1 Concrete: As-cast finishes as defined in Chapter 10, of the A.C.I. 301-66.

1.4.2.2.2 Structural Steel: Clean steel by appropriate means to remove loose mill scale, rust, oil, dirt and other foreign matter. The minimum standard of cleanliness and recommended practice shall conform to Section 1.24.1 of the A.I.S.C. Specifications.

1.4.2 Finishes (Continued)

1.4.2.2.3 Apply one shop coat of primer according to Section 6 (c) of the A.I.S.C. Code of Standard Practice.

1.4.2.2.4 Steel Deck: Wipe coat.

1.4.2.2.5 Other materials: A reasonable smooth surface free of dents, ridges and imperfections.

1.4.2.3 Surfaces exposed to weather or exposed to view in the finished building except those being a distance of 14'-0" or over above finished floor level:

1.4.2.3.1 Concrete members exposed to view:
Architectural concrete as defined in Chapter 13 of the A.C.I. 301-66. Exterior joints in precast concrete framing shall be sealed watertight. All other joints shall have a uniform and pleasing appearance.

1.4.2.3.2 Structural steel:
Structural steel components will receive finish coats of paint by others. In preparation of this field painting the steel shall be prepared according to the requirements of Section 5 of the A.I.S.C. Specifications for Architecturally Exposed Structural Steel. Welds within normal reach shall be ground smooth but shall not impair the strength of the weld.

1.4.2.3.3 Other materials, including fireproofing:
A smooth surface suitable for painting, free of dents, ridges and imperfections.

1.4.3 Protection

1.4.3.1 Components shall receive the finishes as required and shall in addition be suitably protected at all times to prevent damage, rusting, chipping or staining which might impair their structural capacity or their appearance where an exposed structural component is involved.

1.4.3 Protection (Continued)

1.4.3.2 The protective finish of the members provided by painting, zinc coating or other approved means shall be such that the superstructure components may be exposed to the weather for a period of 90 days after commencement of the erection of the Structure Sub-System frame without impairing the capacity of the finish to provide adequate protection against rusting or other defects during the lifetime of the building under the respective normal humidity conditions of the various areas.

1.4.4 Column Shapes and Sizes

1.4.4.1 Exposed steel columns shall be square, rectangular or cruciform. Concrete or fireproofed steel columns shall be square or rectangular. All finished columns shall have sizes in increments of 2" outside dimension.

1.4.4.2 Other shapes or sizes shall be subject to the approval by the CSP Director.

1.4.5 Metal Deck

1.4.5.1 The minimum gauge of metal deck used as a structural element in floors or roofs shall be such that the deck is capable of safely sustaining handling and construction traffic without damage or deformations which may lead to a reduction of the structural load-carrying capacity.

1.4.6 Stairs

Bidders wishing to include stairs as part of this Sub-System may do so. The prices shall be submitted separately from the general bid for Sub-System No. 1.

1.4.6.1 The work shall include for complete stairs, landings and railings, ready to receive finishes under non-systems work (field painting, resilient floor finishes if proposed).

1.4.6 Stairs (Continued)

1.4.6.2 Dimensions shall be as follows:

1. Nominal widths
   5' -0" for single flight width
   10' -0" for 2 flight widths + well
   15' -0" for 2 flight widths + well
2. Tread/Riser combination shall conform to the D.B.C.

1.5 STANDARDS AND BY-LAWS

1.5.1 Standard Specifications and Building Codes

1.5.1.1 Design, materials and workmanship shall conform to the requirements of the Official Building Code of Detroit, Michigan (D.B.C.), unless more stringent requirements are specified herein or departures from the above requirements have been permitted.

1.5.1.2 Where it is the Contractor's desire to depart from the requirements of the Detroit Building Code, adequacy shall be demonstrated by a submission of relevant data, design calculations, test results, proposed procedures to check and guarantee consistent quality and any other proof required by the CSP Director or the Board of Appeals as provided for in the D.B.C.

1.5.2 Fire Safety Standards

1.5.2.1 The following basic requirements apply:
- all structural materials shall be non-combustible.
- roofs, floors, and columns shall have such fire proofing as required by the D.B.C. for each individual school.

1.5.2.2 Where unrated construction elements or assemblies require testing, the method and procedures used to obtain the specified rating shall be as required by the Department of Buildings and Safety Engineering of the City of Detroit. Such approvals shall be obtained sufficiently in advance of the bidding.

1.6 DIMENSIONAL CRITERIA

1.6.1 General Criteria

1.6.1.1 The overall depth of the roof and floor structures considering only the components of the structure Sub-System is not required to be in increments of the 1'-0" module, but shall be located within the sandwich depth specified.

1.6.1.2 Spans for Spanning Members:

The spans for spanning members, i.e. secondary and primary members, shall be a multiple of the 5'-0" planning grid. Some or all of the following spans may be required:

- Secondary members: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70 ft.
- Primary members: 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, and 70 ft.

1.6.2 Tolerances

1.6.2.1 The structure shall be designed, fabricated and erected to conform in the completed state to the following dimensional tolerances, unless more stringent requirements are imposed on the Structure Sub-System by other Sub-Systems. It shall be the responsibility of this Contractor to check whether this is so or not.

1.6.2.2 Dimensional tolerances:

1.6.2.2.1 Variations in vertical lines and surfaces:

Columns:	in 10'-0"	± 1/4"
	in any story up to 20'-0"	± 3/8"
	in any 40'-0"	± 3/4"
Primary and Secondary Spanning Members:		
	in 48"	± 1/4"

1.6.2 Tolerances (Continued)

1.6.2.2.2 Variations from level in horizontal planes:

Surfaces of floors and soffits of spanning members:

in 10'-0"	± 1/4"
in any bay or 20'-0" max.	± 3/8"
in any 40'-0" or more	± 3/4"

These variations are to be related to a floor or roof construction under dead load only (See Article 1.7.3.1).

1.6.2.2.3 Variations from straight or from correct position in plan, for columns and spanning members:

in any bay or 20'-0" max.	± 1/2"
in any 40'-0" or more	± 3/4"

1.6.2.2.4 Variations for floor and roof openings:

in size	± 1/2"
in location	± 1"

1.6.2.2.5 Variations in the location of inserts, fastenings and bolts, except anchor bolts ± 1/4"

1.6.2.2.6 Variations in cross section dimensions of columns and beams and in the thickness of the floor and roof construction ± 1/4"

1.6.2.2.7 Anchor bolts or foundation bolts and other connections between the structure and the work of other trades shall be located and set by others and not this contractor.

1.6.2.2.8 The specified tolerances shall be satisfied at a temperature of 70° F. Therefore, the ambient temperatures shall be taken into account when fabricating and erecting the structural frame.

1.6.2 Tolerances (Continued)

1.6.2.2.9 Structural steel framing shall conform to the erection tolerances outlined in Section 7 (h) of the A.I.S.C. Code of Standard Practice.

1.6.2.2.10 Concrete formwork shall conform to Chapter 2 of the A.C.I. Standard ACI 347-68.

1.7 DESIGN CRITERIA

1.7.1 Design

1.7.1.1 Design and detail all components of the Sub-System to safely resist all dead and live loads and other forces given or implied without exceeding the permissible stresses and the deflection requirements indicated below.

1.7.1.2 The Structure Sub-System frame shall consist of a horizontal plane or planes supported on columns without load-bearing walls, and all floor and roof areas to be constructed with the Sub-System shall consist of rectangular bays supported by columns at their corners.

1.7.1.3 Provisions to resist lateral forces due to wind:

1.7.1.3.1 The lateral forces from wind may be resisted solely by braced bays of the Sub-System, or by frame action.

1.7.1.3.2 The location of the wind resisting braced bays and the forces to be resisted by them will be given by the Engineer for the specific school. The design of the bracing, or frame, including connections, is the responsibility of this Contractor.

1.7.1 Design (Continued)

1.7.1.3.3 The sub-System frame shall be designed so that it is capable of transferring wind forces in floors and roofs to the braced bays by diaphragm action or horizontal bracing without exceeding the permissible lateral drift anywhere in the structure.

1.7.1.4 Where permitted by code, the structure may be exposed. Under these circumstances, the final appearance of the structure will contribute to the architectural character of the schools. Contractors shall consider this by devoting special attention to the consistency, compatibility, simplicity and quality of the structure and its detailing.

1.7.1.5 Notwithstanding other design requirements, the secondary spanning members shall be interconnected in a manner so that a minimum of 25% of any live load placed on such a member is transferred to adjacent parallel members on each side of the member under consideration. (See Sketch on Page III-1-35.)

1.7.1.6 All connections between floor and roof components and columns shall be designed and detailed to provide adequate lateral support to the columns in all directions at these levels.

1.7.1.7 The roof construction shall satisfy the thermal requirements as required.

1.7.1.8 Design and detail the following special conditions:

1.7.1.8.1 Expansion and contraction joints:
They shall follow column lines without the use of double columns. The structural bidder shall state the maximum safe length of the frame considering extreme temperature conditions during erection and describe and detail solutions for these joints.

1.7.1 Design (Continued)

1.7.1.8.2 Changes in level in the floors and roofs:
Changes in level will occur only along column lines.
Pertinent details shall be submitted covering changes in level in roofs and floors of the following amounts:
1'-0", 2'-0", 3'-0", 4'-0" and 5'-0".

1.7.1.8.3 See also Articles 1.9 and 1.10.

1.7.1.8.4 Provisions to extend columns, where a future addition is proposed:
The design drawings will show the extent of these additions and the loadings to be resisted at the temporary roof level.

1.7.1.8.5 Provision for Horizontal Extensions of Floor and Roof Deck Elements:

- Provisions shall be made, where noted on the drawings, to support a strip of floor or roof deck spanning 5'-0" along junctions with non-system roofs or floors and with future horizontal extensions to the structure sub-system frame.

1.7.1.8.6 Provisions to connect floor or roof spanning members to columns for horizontal extensions:

- Where noted on the drawings, make provisions to connect secondary or primary members to perimeter columns in roofs or floors to extend the systems frame in the future or to join up with non-system framing.
- Apart from the transfer of vertical reactions, these provisions shall also allow the transfer of horizontal forces equal to 10% of the vertical reactions.

1.7.1.8.7 Provisions along vertical setbacks in the vertical skin:

- Along setbacks in the vertical skin, such as along low roofs, provide suitable details to receive the vertical skin and to join and support the roof and floor deck elements.

1.7.1 Design (Continued)

1.7.1.8.8 Provision for the Support of a Permanent Wall:

- Where noted on the drawings, reinforce the system frame to support a permanent wall weighing 800 lbs. per lin. ft.
- This wall load shall be considered to be applied on/or a maximum of 1'-0" off the planning grid.
- This condition may occur along the edge of a gymnasium or cafeteria where these areas are supported on a system floor frame.

1.7.1.9 The following basic design assumptions have been made in the preparation of the Bidding Sheets:

1.7.1.9.1 Secondary spanning members may be spaced @ 20", 30", 5'-0" or 10'-0" on centers and are simply supported.

1.7.1.9.2 Primary spanning members are simply supported on columns, or are adequately connected to provide required moment resistance.

1.7.1.9.3 The floor and roof decks are considered independently from the spanning members as far as quantities are concerned.

1.7.1.9.4 Wind is resisted by braced bays or frame action only, spaced at a maximum distance of 150 ft. in either direction or as indicated on plans.

1.7.1.9.5 Ceiling suspended from the floor and roof deck and the bottom of secondary spanning members with other floor or roof loads applied through the deck to the top of the spanning members.

1.7.1.9.6 Reactions from secondary spanning members applied on primary members as concentrated loads.

1.7.1 Design (Continued)

1.7.1.9.7 Operable partitions, with the exception of gymnasium partitions shall be supported on the floor below. Gymnasium partitions shall be supported by an independent frame at a grid line, or shall be adequately provided for by the primary members above or below. Refer to Item 4.6.2.2.1 of Sub-System No. 4. The frame shall be laterally supported by the floor or roof.

1.7.1.10 Alternatives to the above design assumptions made in the preparation of the Bidding Sheets may be proposed with the bids for evaluation. Among others, alternatives may include the following:

1.7.1.10.1 Continuity of members may be utilized in the Sub-System frame design.

1.7.1.10.2 The spanning members of the floor and roof construction may be designed to act as a two-way space grid.

1.7.1.10.3 The floor or roof deck elements may be monolithic with the spanning members serving as top flanges to these members.

1.7.1.11 The above alternatives will require special formulae for converting the parameters and quantities of the proposal. The resulting modifications to the proposal shall be developed by this Contractor in cooperation with and to the approval of the CSP Director to make an evaluation and a simple costing of the Sub-System possible. Proposals for this conversion must be submitted for evaluation with the bids.

1.7.1 Design (Continued)

1.7.1.11.1 Limitations:
If certain combinations of special conditions such as a particular layout of openings cannot be accommodated by the proposed Structure Sub-System the respective limitations shall be clearly stated by this Contractor in the bid.

1.7.2 Deflections and Drift Limitations

1.7.2.1 When subjected to full live load and the loading from operable partitions as described in the design loading conditions, the vertical deflections of the individual components of the floor and roof system shall not exceed 1/360 of the span, or 2" whichever is least.

1.7.2.2 The deflection may exceed 2" only if it can be demonstrated that the interfacing Sub-System and all other building elements can satisfactorily perform with larger deflections.

1.7.2.3 The aforementioned deflection limits are maximum values. It is this Contractor's responsibility to check and confirm that other interfacing Sub-Systems do not require more stringent deflection limitations.

1.7.2.4 Proposals using reinforced or prestressed concrete spanning members shall include a detailed outline of the steps that will be taken to cope with creep deflections as related to the age of the units at the time of their installation. The specified tolerances must not be exceeded by creep during the lifetime of the building.

1.7.2.5 Maximum horizontal displacements (drift):
The drift of the frame due to horizontal forces shall be limited to 0.002 times the floor to floor height.

1.7.3 Cambers

1.7.3.1 Floor members shall be cambered to cancel out the deflections due to the dead load of the floor construction, including any topping and for concrete members a third of the calculated long term deflections due to creep in addition.

1.7.3.2 Co-ordinate the design of the roof construction with respect to the drainage requirements.

1.7.4 Loading

1.7.4.1 In addition to the dead load of the structure and the dead load of all other components incorporated in the building, the Structure Sub-System frame and its components shall be designed to safely resist the live loads specified below without exceeding the maximum deflections specified.

1.7.4.2 The design of the Sub-System components shall be based on specific governing design-loading conditions, which are defined below.

Areas over which they govern will be noted on the design drawings. These conditions also form the basis for the quantity estimate given in the bidding sheets.

1.7.4.3 If the weight of the components of another Sub-System exceeds the weight assumptions outlined below, the capacity of the structural components affected shall be increased accordingly.

1.7.4.4 Basic roof loads:
These basic loads are used in the development of the governing design-loading conditions for roofs.

1.7.4 Loading (Continued)

1.7.4.4.1 Dead load:

- dead load of components	DL
- insulation and roofing, unless forming a part of the Sub-System	7 psf
- Lighting-Ceiling	6 psf
- normal mechanical ducts and services	4 psf

1.7.4.4.2 Live load: (snow)

- Uniformly distributed loads in psf:

general area	30 psf
in areas where an accumulation of snow must be considered.	50 psf (min.)

- Concentrated loads: (Alternate loading)

  One 5000 lb. load anywhere on module lines, centered on secondary spanning members, applied to top of member.

1.7.4.5 Basic floor loads:

These basic loads are used in the development of the governing design-loading conditions for floors.

1.7.4.5.1 Dead load:

- dead load of components	DL
- Lighting-Ceiling	6 psf
- normal mechanical ducts and services	4 psf

1.7.4.5.2 Live load:

- Uniformly distributed loads in psf:

Classrooms (including partitions)	80 psf
Corridors & Assembly areas (including partitions)	100 psf
Mechanical areas	150 psf

1.7.4 Loading (Continued)

- Concentrated loads: (Alternate loading)
  2000 lbs. or 3000 lbs. applied over an area 2½ ft. square located so as to cause maximum effects on an otherwise unloaded floor.

1.7.4.6 Governing design loading conditions:
These will be noted on the design drawings by the Engineer.

1.7.4.6.1 Roofs:

RL 1	Dead load of Sub-System	DL
	Roofing, ceiling and ducts	17 psf
	Snow	30 psf
	No concentrated load	
		DL + 47 psf

The loading RL 1 will apply over most of the roof areas.

RL 2	Dead load of Sub-System	DL
	Roofing, ceiling and ducts	17 psf
	Accumulation of snow	50 psf
	No concentrated load.	
		DL + 67 psf

The loading RL 2 will apply along changes in roof levels in excess of 4' difference in roof elevations.

1.7.4 Loading (Continued)

RL 3 This loading condition consists of 2 separate load cases.

The secondary spanning members must be designed to satisfy both load cases.

- Load case a):

Dead load of Sub-System	DL
Roofing, ceiling and ducts	17 psf
Snow	30 psf

Concentrated loads from mechanical equipment.

DL + 47 psf + concentrated mechanical loads

- Load case b):

Dead load of Sub-System	DL
Roofing, ceiling and ducts	17 psf
Snow	30 psf

The load from an operable partition 24 feet high extending for the full length of the span, considered suspended from one secondary spanning member only.

DL + 47 psf + operable partition

The loading RL 3 will apply only in isolated cases where concentrated loads may be required or where an operable partition higher than 18'-0" is suspended from the roof.

1.7.4.6.2 Floors:

FL 1	- Dead load of Sub-System	DL
	Lighting-Ceiling	6 psf
	Normal mechanical ducts and services	4 psf
	Live load including partitions	80 psf

1.7.4 Loading (Continued)

DL + 90 psf

- This loading condition FL 1 consists of a set of 6 separate load cases involving live load, partition line loads and reactions from operable partitions.
- The load cases are described on sketches contained at the end of the Structure Sub-System specification.
- The above load cases represent governing load patterns to allow the degree of flexibility in the size, use and occupancy of areas involving a multitude of partition arrangements required by the academic specifications.
- Partition live loads and concentrated load combinations described on the sketches, shall be assumed to be spaced 30 feet apart.

DL + 10 psf + live load and partition load cases

- This loading will generally apply in classroom areas.

FL 2 - Dead load of Sub-System DL

Lighting-Ceiling	6 psf
Normal mechanical ducts and services	4 psf
Live load including partitions	100 psf

DL + 110 psf

- This loading will generally apply in gymnasiums, corridors or large areas of assembly without a present or future need for partitions.

1.7.4.6 Loading (Continued)

FL 3	Dead load of Sub-System	DL
	Lighting-Ceiling	6 psf
	Normal mechanical ducts and services	4 psf
	Concrete topping and waterproofing	30 psf
	Live load	150 psf
		DL + 190 psf

- This loading will generally apply in mechanical rooms.

1.7.5 Floor and Roof Loadings to be Used in the Design of Individual Components

1.7.5.1 The design of the floor and roof components and their assemblies shall be based on the floor and roof loading conditions outlined below as applicable. In addition, the design must also consider other forces the structure or components may be subjected to, such as forces from wind, temperature changes, erection and the like.

1.7.5.2 Roofs:

- Deck elements:
  Loading conditions RL 1 or RL 2 only.
- Secondary spanning members:
  Loading conditions RL 1, RL 2 or RL 3.
- Primary spanning members:
  As required by the loading on the secondary spanning members.

1.7.5 Floor and Roof Loadings to be Used in the Design of Individual Components (Continued)

1.7.5.3 Floors:

1.7.5.3.1 Deck Elements:

1. Loading conditions FL 1 or FL 2 only:
   Satisfy separately the following three load cases:
   a) Uniformly distributed load case:
      Dead load plus live load of 80 or 100 psf.
   b) Concentrated load case: (Alternate loading)
      Dead load plus 2000 lbs. placed upon a space of 2½ ft. square with the span otherwise unloaded.
   c) Line load case:
      Dead load plus 240 lbs. per lin. ft. placed in any direction and location on the floor deck in addition to a uniformly distributed load of 80 psf or 100 psf.
   d) Satisfy separately the live load required or specified by the mechanical requirements sub-system.
2. Loading condition FL 3:
   Satisfy separately the following two load cases:
   a) Uniformly distributed load case:
      Dead load plus live load of 200 psf.
   b) Concentrated load case:
      Dead load plus 3000 lbs. placed upon a space of 2½ ft. square with the span otherwise unloaded.

1.7.5.3.2 Secondary spanning members:
One loading condition of FL 1 to FL 3.

1.7.5 Floor and Roof Loadings to be Used in the Design of Individual Components (Continued)

1.7.5.3.3 Primary spanning members:
As required by the loading on the secondary spanning members supported by them. For equivalent loading see Page III - 1-33.

1.7.5.3.4 Columns:
As required by the reactions from the secondary and primary spanning members. For equivalent loadings see Page III - 1-33.

1.7.6 Special Loadings

1.7.6.1 From Vertical Skin Components:

Consider reactions from a compatible Sub-System No. 5 - Vertical Skin, including among others gravity loads, wind loads, torsional forces, thermal forces and erection forces.

1.7.6.2 From Interior Space Divisions:

1.7.6.2.1 Consider a minimum lateral load of 35 lbs. per lin. ft. or a load of 175 lbs. at 5'-0" on center at the top of all demountable partitions transferred locally to the structure by the Sub-System No. 4.

1.7.6.2.2 Consider a minimum lateral load of 50 lbs. per lin. ft. or a load of 250 lbs. at 5'-0" on center at the top of all operable partitions acting on the bracing for these partitions unless a heavier force is required by the compatible Sub-System No. 4.

1.7.7 Modified Design Loading Conditions

1.7.7.1 Only in isolated instances secondary or primary spanning members will be required to sustain special uniformly distributed or concentrated loads creating a loading condition which is not

1.7.7 Modified Design Loading Conditions (Continued)

1.7.7.1 (con'td) covered by the design-loading conditions outlined above. This condition may, for instance, occur in floors at stair openings to support the stairs.

1.7.7.2 Components of the Structure Sub-System shall be used in these instances if practical, selected by using a heavier regular superimposed loading resulting in shears and moments equivalent to or greater than those resulting from the irregular loading condition. This selection shall be made by this Contractor in close cooperation with the Engineer.

1.7.7.3 Where it is found in a specific instance that a suitable member is not available within the ranges of the Catalog's components, the layout of the framing shall be either revised by the Engineer or the member in question shall become a non-system element.

1.8 ERECTION

1.8.1 This Contractor shall be responsible for the erection and the safe stability of the Sub-System frame until the entire Sub-System frame is completed and capable of resisting all design forces.

1.8.2 Make adequate provisions for erection stresses and for sufficient te[illegible] bracing to keep the Sub-System frame plumb and in true alig[illegible] until its completion including the floor and roof deck and the elements which are part of the wind resisting system.

1.8.3 Install the bracing members in a manner to provide nominal stresses in these members in the completed building under normal operating conditions.

1.8 Erection (Continued)

1.8.4 Erection operations, including the installation of temporary shoring, shall be carried out without loading portions of the Sub-System frame and non-system construction in excess of their safe load-carrying capacity. Where the load capacity of the structure may be exceeded during his work, this Contractor shall shore constructed portions of the structure as required to provide adequate support without overloading members or foundations beyond the permissible limits.

1.8.5 Submit further for the engineering inspection complete erection procedures of all major members including details of all temporary shoring required well in advance of erection.

1.8.6 Where grouting is required in connections of the Sub-System frame, develop suitable methods to permit this work to be done in summer and winter.

1.8.7 Setting Base Plates:

Set column bases on reinforced concrete foundations or piers true and level at the proper elevation and grout full. Use methods of vertical and horizontal adjustments during erection, which permit full grouting. Design base plates for bearing stresses as allowed by Section 1002. Chapter 10 of A.C.I. 318-63. The use of levelling plates will be permitted to facilitate the setting of columns.

1.8 Erection (Continued)

1.8.8 Structural members may be stockpiled, provided they have been previously inspected and accepted by the inspection agency appointed by the Owner and provided storage is done in a manner which will not cause any damage to, nor impair the strength or the finish of the members.

1.8.9 Design and detail column bases at foundation level to provide 3" vertical clearance between the finished floor (slab-on-grade) and all bolts, stiffeners, base plates, or other similar materials.

1.9 ATTACHMENT OF OTHER SUB-SYSTEMS

1.9.1 All structural connections between Sub-System components specified herein shall be included in this contract.

1.9.2 Allow in the structure for the attachment of the building components of other Sub-Systems to the structure although part of the responsibility for attachment will be by others. This contractor shall describe in detail the proposed connections and the extent of his responsibility to enable the CSP Director to check on the adequacy and completeness of these attachments.

1.9.3 Among others, the Sub-System shall be designed and detailed to provide the following:

1.9.3.1 A method of attachment of a compatible Sub-System No. 3 - Lighting-Ceiling over all areas of the buildings.

1.9.3.2 Means for attaching Sub-System No. 5 - Vertical Skin to the Structure Sub-System.

1.9 ATTACHMENT OF OTHER SUB-SYSTEMS (Continued)

1.9.3.3 Means for attaching Sub-System #4 - Interior Space Division to the Structure Sub-System or to a Sub-System #3 - Lighting-Ceiling provided by others, which will have sufficient strength to receive the partition panels.

1.9.3.4 Provisions for operable partitions:
Make provisions to connect lateral bracing, hangers and supporting frames for operable partitions to the Structure Sub-System.

1.9.4 This Contractor shall also prepare a schedule of acceptable methods of attaching other building elements, which do not form part of the System such as mechanical piping, stairs and the like, to the Sub-System frame.

1.10 OPENINGS AND PASSAGE OF SERVICES

1.10.1 Integrated Sandwich

1.10.1.1 The integrated sandwich shall be designed and detailed to provide space for Sub-System #2 - Atmosphere and openings and holes in floor and roof decks including their trimming.

1.10.2 Small Openings or Holes up to 4'-0" Clear Width or Length

1.10.2.1 In isolated instances openings will be required for skylights or roof hatches. Other openings or holes will be required for vents, drains or mechanical ducts or services.

1.10.2.2 The location and size of skylights or roof hatches will be noted on the design drawings, whereas the number, size and location of other openings or holes must be obtained from the respective Sub-System Contractors.

1.10.2.3 Where required only this Contractor shall make provisions for these openings in the roof and floor deck between secondary spanning members and shall develop pertinent details of their framing and trimming.

1.10.2 Small Openings or Holes up to 4'-0" Clear Width or Length (Cont.)

1.10.2.4 All floor or roof deck elements shall be designed and constructed in such a way as to allow the drilling of isolated holes up to 5" diameter in the roof and floor deck at a later date, clear of spanning members and bridging. A method shall be given by the Contractor for the cutting of such holes.

1.10.3 Large Openings

1.10.3.1 Large openings as required for stairs, large mechanical ducts, etc.

1.10.3.2 Openings shall be assumed to be located between regular spanning members.

1.10.3.3 The length and width shall be a multiple of 5' -0" minus the width of the spanning members.

1.10.3.4 Columns will be introduced at the corners of the opening unless the opening can be framed using regular components.

1.10.3.5 Sidewalls of stairs will be self-supporting, but will be tied laterally to the frame by others.

1.10.3.6 Spanning members and any columns around the opening shall be designed for the stair load in addition to other gravity loads. These loads will be given by the Engineer on the design drawings for the individual school.

1.11 INSPECTION AND TESTING

1.11.1 Testing Prior to Bid

1.11.1.1 Unless suitable test results are already available, the components of the Sub-System shall be tested at the expense of this Contractor during the bidding period by an independent Inspection and Testing Company approved by the City of Detroit and the CSP Director. These tests shall confirm the adequacy of the representative components to perform in accordance with the specification.

1.11.1 Testing Prior to Bid (Continued)

1.11.1.2 The extent of this testing will be determined by the CSP Director and will depend on the complexity of the design and detailing of the Sub-System and on the use of new materials and design and detailing features. This testing may among others include the following tests:

- Gravity load tests
- Tests on diaphragm action of floor and roof decks
- Tests on the performance of the floor and roof construction to distribute loads laterally
- Tests on connections
- Material tests
- Fire tests
- Tests to evaluate vibrations.

1.11.1.3 The required testing program will be prepared by the CSP Director in close co-operation with this Sub-System Contractor.

1.11.2 Inspection and Testing of Materials, Components and Assemblies to be Incorporated in the CSP Schools During Fabrication and Erection

1.11.2.1 All materials and workmanship shall be subject to inspection at any time and at any place by qualified inspectors representing the Owner.

1.11.2.2 The CSP Director will appoint, with the approval of the Detroit Board of Education, an inspection and testing company whose representatives will carry out shop and field inspection. The Board of Education will pay for this inspection and testing except for those tests or inspections revealing less than the required strength or other performance requirements. For these tests the particular Sub-System Contractor will be required to pay, and for subsequent tests made necessary thereby.

1.11.2 Inspection and Testing of Materials, Components and Assemblies to be Incorporated in the CSP Schools During Fabrication and Erection (Continued)

1.11.2.3 Make copies of mill test reports of structural steel, steel deck, reinforcing and prestressing steel (properly correlated to the materials) available to the Engineer upon request. Mill test reports will be accepted in lieu of mill inspection. The cost of mill test reports shall be paid for by this Contractor.

1.11.2.4 Supply the following certificates and specimens where applicable in advance of the work at this Contractor's expense (certificates shall be prepared by an independent approved inspection company):

- Source of supply of cement and aggregates and certification that these materials conform to the specifications referred to in the Sub-System Catalogue.
- Certification that the concrete mixes proposed will meet the requirements for strength and other properties noted.
- Source of supply of reinforcing, structural, and prestressing steel. Certification based upon suitable testing of the first shipment of each size of each grade of member, bar or strand used.
- Stress strain curves pertaining to the prestressing steel strand lots.
- Provide a sample five feet long taken at random from each reel of prestressing strand used on the project. Sampling and stressing of prestressing steel shall conform to ASTM A416.

1.11.2.5 Among others, the following tests may be performed by the Inspection and Testing Company as directed by the Engineer:

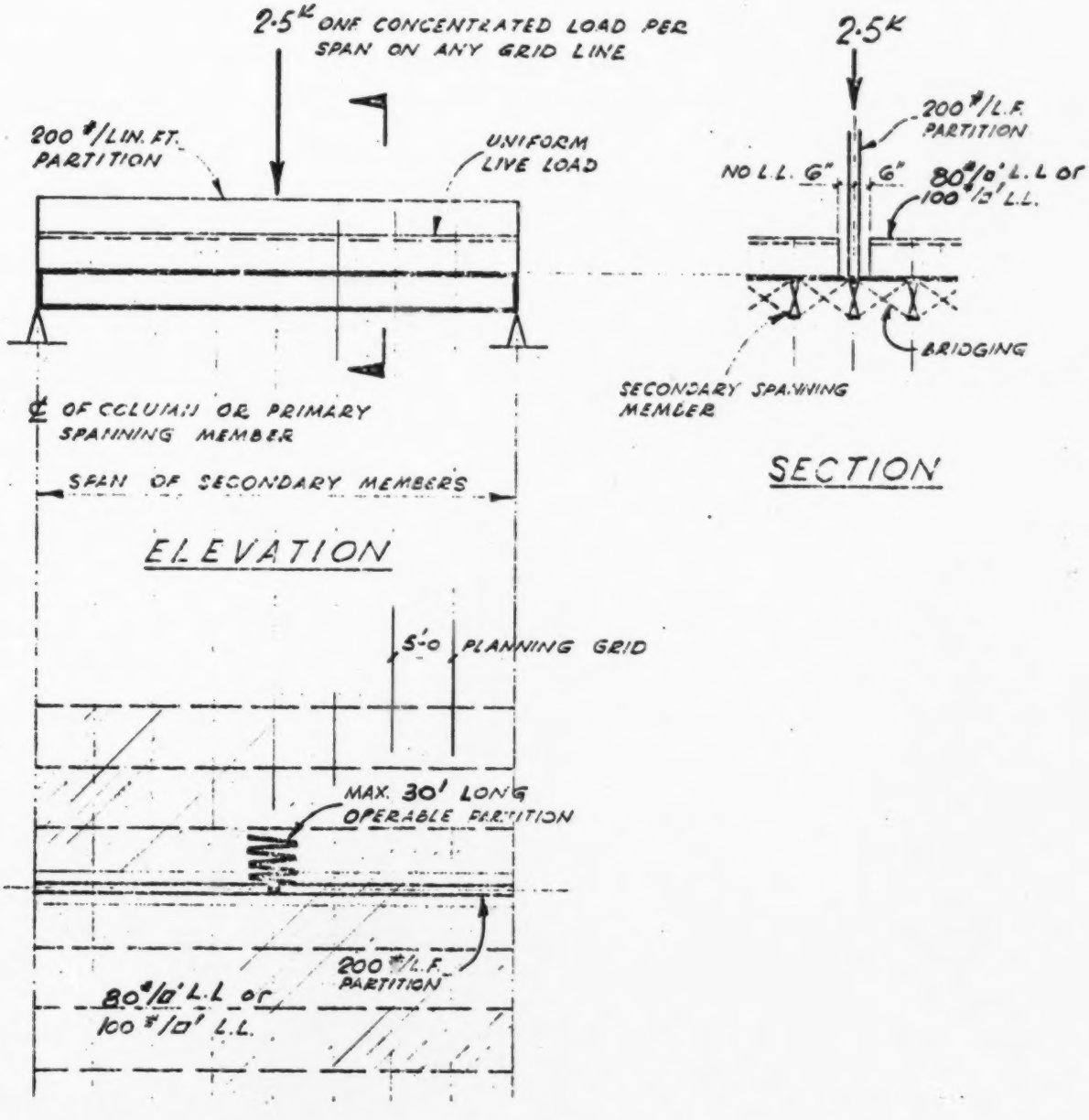
- Standard concrete cylinders
- Slump tests
- Air entrainment tests
- Tensile and bend tests on reinforcing and prestressing steel
- Torque tests on HT bolts
- Flood tests on roofs.

1.11.2 Inspection and Testing of Materials, Components and Assemblies to be Incorporated in the CSP Schools During Fabrication and Erection (Continued)

1.11.2.6 The Contractor shall supply all labor required and shall co-operate with the Inspection and Testing Company to obtain the required specimen and shall replace material taken for tests at this Contractor's expense.

DESIGN LOADING CONDITION FL1

LOAD CASE a

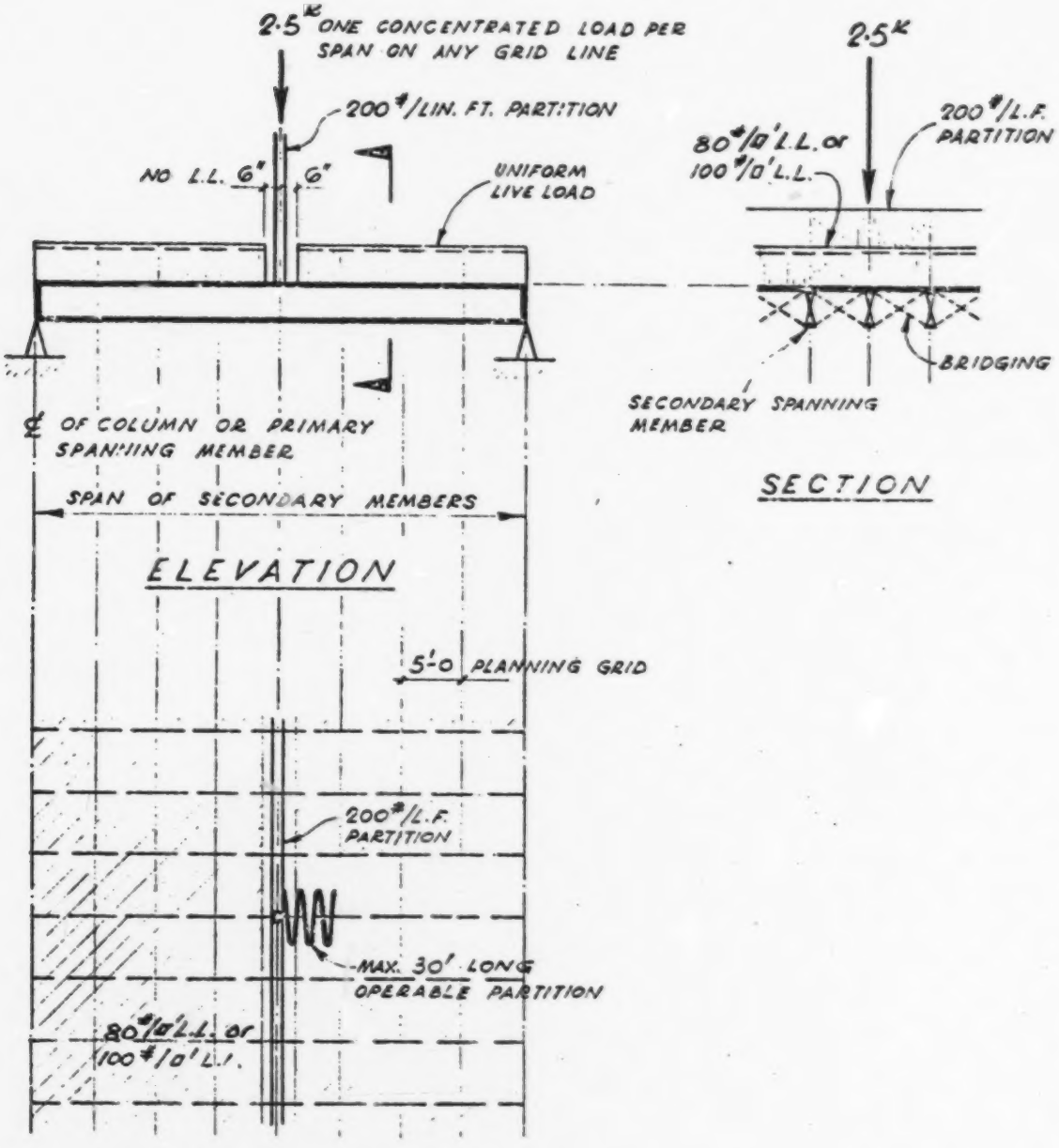


PLAN

SHOWING OPERABLE PARTITION WHICH CREATES THE CONCENTRATED LOAD

DESIGN LOADING CONDITION FL 1

LOAD CASE b

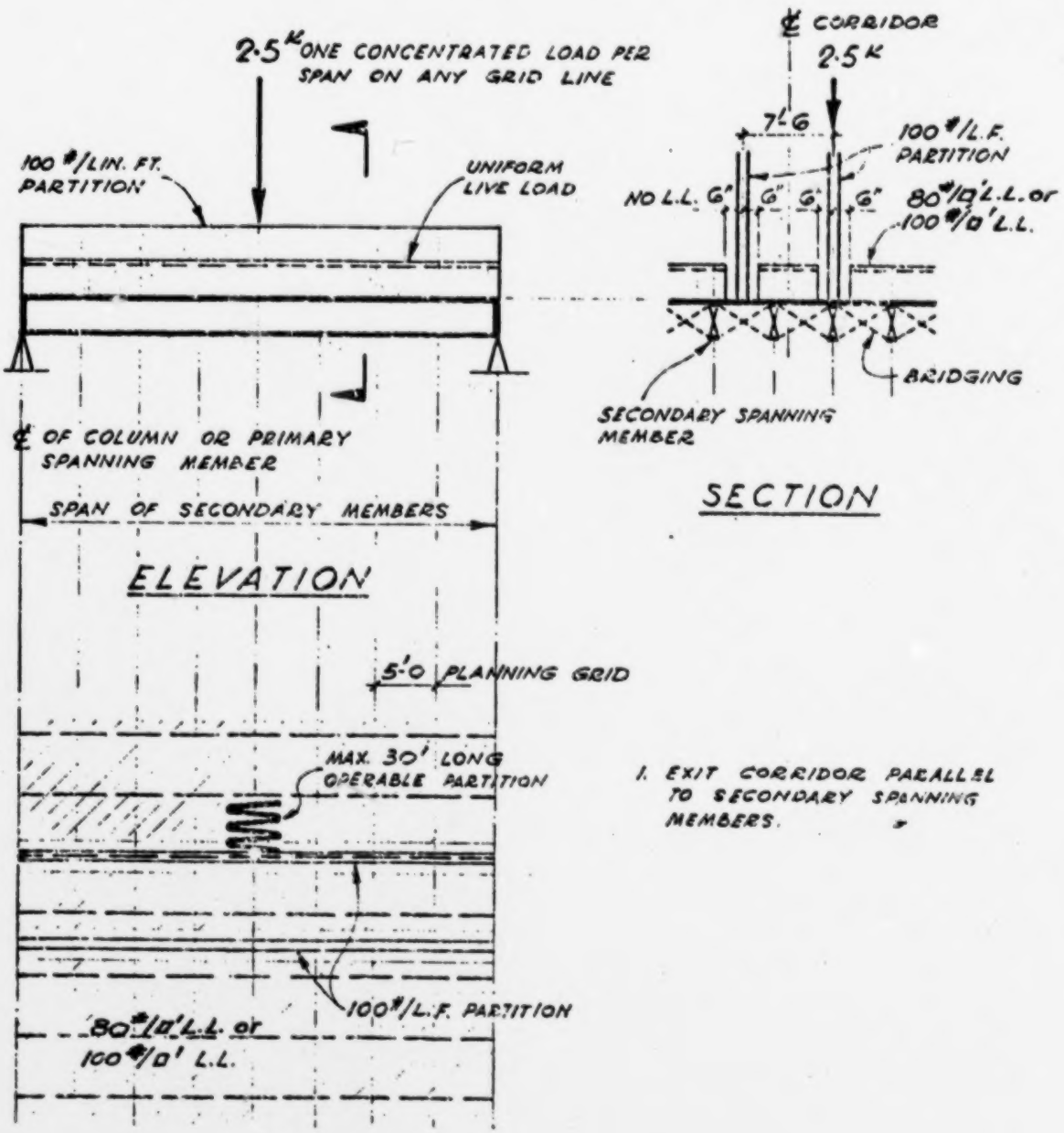


PLAN

SHOWING OPERABLE PARTITION WHICH CREATES THE CONCENTRATED LOAD

DESIGN LOADING CONDITION FL 1

LOAD CASE C



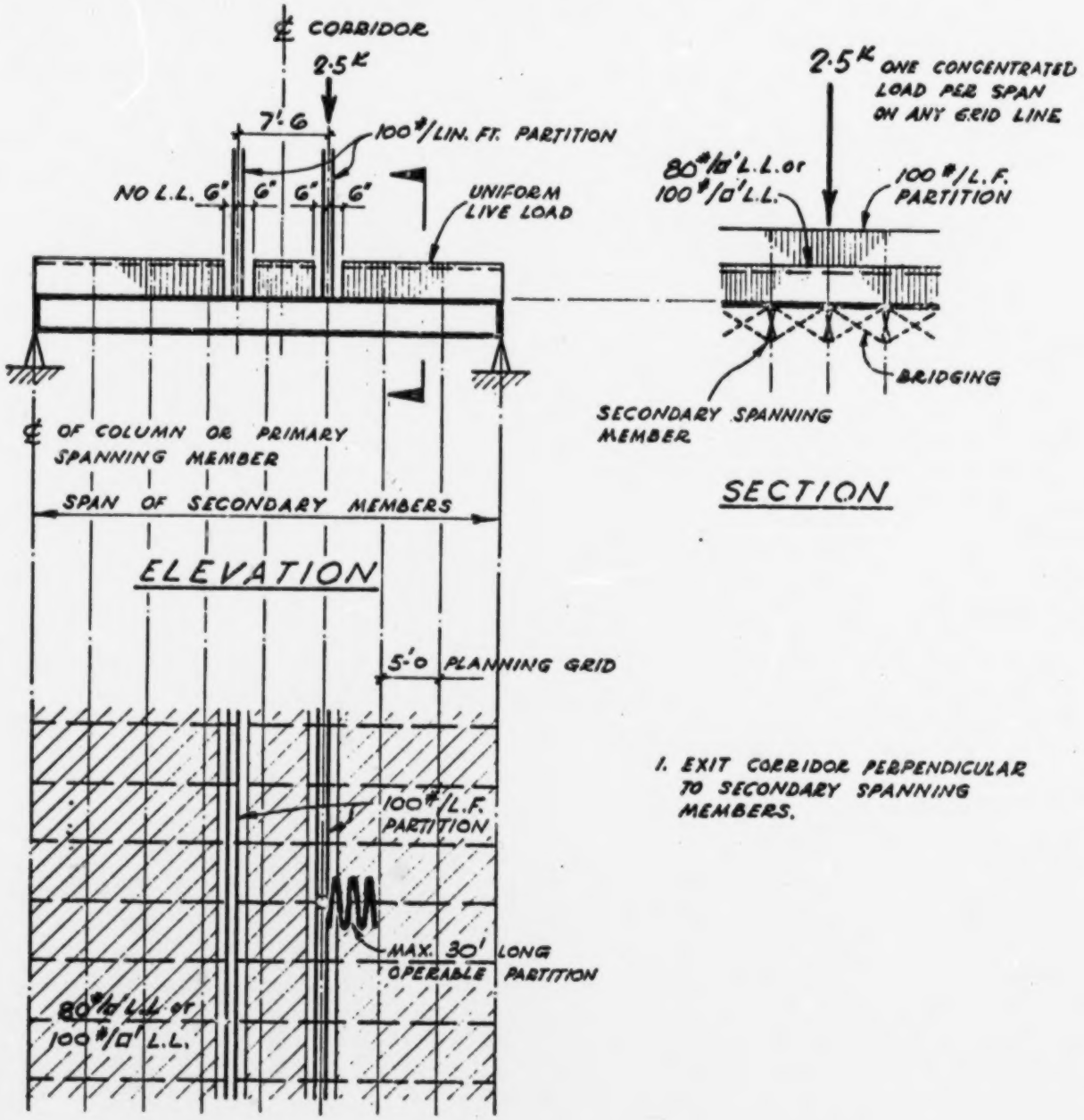
1. EXIT CORRIDOR PARALLEL TO SECONDARY SPANNING MEMBERS.

PLAN

SHOWING OPERABLE PARTITION WHICH CREATES THE CONCENTRATED LOAD

DESIGN LOADING CONDITION FL 1

LOAD CASE d



1. EXIT CORRIDOR PERPENDICULAR TO SECONDARY SPANNING MEMBERS.

PLAN

SHOWING OPERABLE PARTITION WHICH CREATES THE CONCENTRATED LOAD

DESIGN LOADING CONDITION FL 1

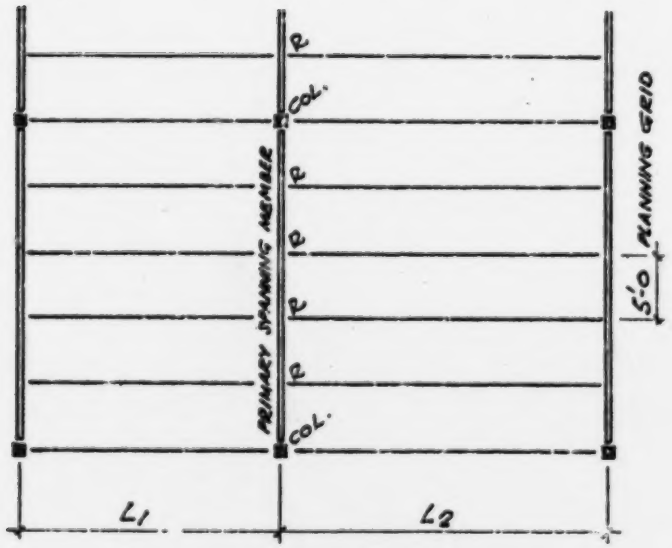
EQUIVALENT UNIFORM LOADING FOR PRIMARY SPANNING MEMBERS AND COLUMNS.

IN LIEU OF THE INDIVIDUAL LOAD CASES a TO d NOTED ON PAGES III-1-31 TO 34 THE DESIGN LIVE AND PARTITION LOADING FOR PRIMARY SPANNING MEMBERS AND COLUMNS FROM A PARTICULAR FLOOR AREA MAY BE BASED ON THE FOLLOWING EQUIVALENT UNIFORMLY DISTRIBUTED LOADINGS:

1. PRIMARY SPANNING MEMBERS:
   LIVE AND PARTITION LOADING REACTIONS FROM SECONDARY SPANNING MEMBERS $R = L \times W \times 5.0$ (FOR VALUES OF L AND W SEE TABLE BELOW)

2. COLUMNS:
   a) FOR TRIBUTARY AREAS OF 200 SQ. FT. AND OVER:
   P = TRIBUTARY AREA x 95 LBS./SQ. FT.

   b) FOR TRIBUTARY AREAS LESS THAN 200 SQ. FT.
   P = TRIBUTARY AREA x 110 LBS./SQ. FT.



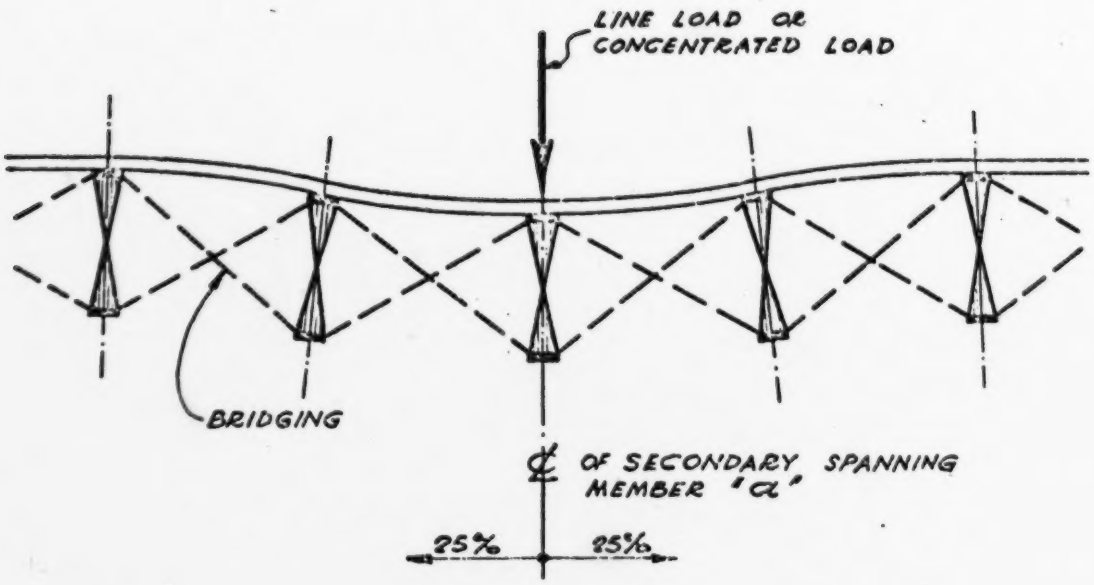
SPAN L IN FT.	EQUIVALENT LOADING W = PSF.
20	120
25	116
30	114
35	112
40 AND OVER	95

$$L = \frac{L_1 + L_2}{2}$$

R... SUM OF END REACTIONS OF SECONDARY MEMBERS.

PART FLOOR

STRUCTURE SUB-SYSTEM



1. THIS SKETCH DESCRIBES THE DESIGN CRITERIA FOR THE LATERAL DISTRIBUTION OF LOADS BETWEEN SECONDARY SPANNING MEMBERS.

2. STIFFNESS REQUIREMENTS:
   25% OF ANY LINE OR CONCENTRATED LOAD PLACED ON THE MEMBER (a) SHALL BE TRANSFERRED TO ADJACENT MEMBERS ON EACH SIDE OF MEMBER (a)

3. STRENGTH REQUIREMENTS:
   DESIGN DISTRIBUTION SYSTEM AS REQUIRED BY THE LINE LOADS AND CONCENTRATED LOADS OF LOADING CONDITION FL1.

4. SPANNING MEMBERS AND BRIDGING SHOWN INDICATIVE ONLY.

Firm Name:_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 1

SUB-SYSTEM NO. 1 - STRUCTURE

(Submit in Duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 1 Work - Structure

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility, and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments and itemized breakdown per school for the system below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. This sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____ Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

P.3 (cont) INTERFACING BIDDER BY CHOICE

PRICE ADJUSTMENT

Re Sub-System No. 2 - Atmosphere

1st _____	Base Bid _____
2nd _____	$ _____
3rd _____	$ _____

Re Sub-System No. 3 - Lighting-Ceiling

1st _____	Base Bid _____
2nd _____	$ _____
3rd _____	$ _____

Re Sub-System No. 4 - Interior Space Division

1st _____	Base Bid _____
2nd _____	$ _____
3rd _____	$ _____

Re Sub-System No. 5 - Vertical Skin

1st _____	Base Bid _____
2nd _____	$ _____
3rd _____	$ _____

P.4 All work covered by the following Addenda is included with this Proposal. The Base Bid shall include:

Addendum No. _____, dated _____
Addendum No. _____, dated _____
Addendum No. _____, dated _____
Addendum No. _____, dated _____

P.5 In compliance with the instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master CPM Progress Schedule prepared by the Owner.

P.6 The following separate prices are included in the Base Bid, but are brought forth for information and/or accounting purposes.

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($)

2) Cerveny School Addition

The sum of _____ Dollars ($)

P.6 (cont) Cost Breakdown per School (continued)

3) Sherrard School Addition

The sum of _____ Dollars ($)

4) Delbert E. Roberts Addition to Cooley High School

The sum of _____ Dollars ($)

P.7 General

P.7.1 The lump sum bid shall be based on the quantities of components and special conditions contained herein.

P.7.2 The quantities are to be obtained from the preliminary sketch plans of the four schools in the CSP school building program with an aggregate total floor area of not less than 250,000 square feet of total floor area.

P.7.3 Unit cost figures are required to be supplied by the successful bidder. Depending upon the effects of other Sub-Systems on the Structure Sub-System, alternate unit prices may be quoted. The total cost of all the components and the special conditions listed taken at their respective unit cost shall equal the lump sums quoted.

P.7.4 The unit prices quoted shall include all developing cost and testing, material and workmanship, overhead and applicable taxes.

P.7.5 The undersigned submits the following Unit Prices which shall govern for authorized additions or deductions in the work and shall include all charges for supervision, overhead, and profit, and shall be applied to net differences in quantities. The following Unit Prices are to be used as a basis for negotiating additions to/or deductions from the Contract.

P.7.6 Bidders will be evaluated primarily on the basis of the composite total price of a complete set of Sub-Systems, but the degree of consistency, performance and the effects of the structure on the foundations will also be considered.

P.7.7 Cost of levelling plates, base plates, and anchor bolts shall be included in the unit prices for the columns.

P.7.8 Principal components:

- floor and roof deck elements
- spanning members
- columns
- wind bracing

P.7 General (continued)

P.7.9 Special conditions forming part of the Sub-System:

- spandrel beams (spanning members subject to additional loads from the Vertical Skin Sub-System)
- expansion joints along column lines
- changes in floor and roof levels
- small openings including trimming
- large stair openings in floors including trimming
- fire-proofing
- provisions at the top of columns for future extensions.

P.8 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions to the work, and shall include all charges for supervision, overhead, profit, and shall be applied to the net differences in quantities.

The following unit prices are to be used as a basis for negotiating additions and/or deductions in the Contract:

P.8.1 Number and Description of Unit Prices.

		ADD	DEDUCT
1)	Structural Concrete for any purpose, in place, complete, except forms and reinforcing steel, per cu.yd.	$ _____	$ _____
2)	Reinforcing Steel for structural concrete, including supports, bending and placing, per pound	$ _____	$ _____
3)	Formwork for structural concrete including all walling, bracing, oiling, cleaning and appurtenant work, and removal, in place, complete, per square foot of concrete contact surface	$ _____	$ _____
4)	Structural Steel for any purpose, in place, complete, except miscellaneous iron, per pound	$ _____	$ _____

P.8 Unit Prices (continued)

P.8.1 (cont.) Number and Description of Unit Prices (continued)

	ADD	DEDUCT
5) Miscellaneous steel for any purpose, in place, complete, except structural steel, as defined by the bidder on this proposal form or later as defined by the Owner, per pound	$ _____	$ _____
6) Other structural materials for any purpose as may be appropriate	$ _____	$ _____

P.9 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.10 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education, of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bonds and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.11 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions and agrees to abide by the conditions set forth.

P.12 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1. _____

2. _____

3. _____

c. ( ) Corporation, incorporated under the State Laws of

_____.

P.13 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date

Firm Name

_____

By _____

In the Presence of

Title _____

_____

Official Address:

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the Proposal shall be declared irregular.)

SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 2 - ATMOSPHERE

C O N T E N T S

ITEM		PAGE NO.
2.1	CONTRACT DOCUMENTS.....	III-2-1
2.2	SCOPE.....	III-2-1
2.3	DEFINITIONS.....	III-2-4
2.4	PERFORMANCE TESTING.....	III-2-5
2.5	TYPES OF SPACE ACCORDING TO REQUIREMENTS.....	III-2-5
2.6	DESIGN CRITERIA.....	III-2-19
2.7	BIDDING REQUIREMENTS.....	III-2-28
	PROPOSAL NO. 2.....	III-2-P.1

SPECIFICATIONS FOR THE FIRST CSF BUILDING SYSTEM

SUB-SYSTEM NO. 2 - ATMOSPHERE

2.1 CONTRACT DOCUMENTS

Parts I, II and III are part of this specification.

2.2 SCOPE

2.2.1 Work Included

2.2.1.1 A complete heating and air conditioning system consisting of an air distribution system and a means of overcoming heat gains and losses in the space with thermostatic and other controls to regulate within defined limits temperature, air changes, air movement, air cleanliness, air pressures and relative humidity. A means of overcoming perimeter heat loss shall be provided in all academic, Science, Music and Administration areas.

2.2.1.2 This Sub-System shall easily accommodate future changes in the Sub-Division of interior space on an incremental basis for similar use requirements.

2.2.1.3 Make-up air systems for kitchen and automotive shops.

2.2.1.4 Heating and Ventilating systems for locker rooms, toilet rooms and other areas as indicated on the drawings.

2.2.1.5 All toilet rooms and locker rooms exhaust systems.

2.2.1.6 All plumbing which forms part of the above installation.

2.2.1.6.1 Gas piping from gas meter to all heating equipment using gas for fuel.

2.2.1.7 All thermal insulation and covering, including all necessary insulation and vapor barrier to prevent vapor condensation in ductwork and on piping.

2.2 SCOPE (Continued)

2.2.1 Work Included (Continued)

2.2.1.8 All electrical equipment which forms part of the installation including:

2.2.1.8.1 All electrical heaters, if any, contactors, controls and wiring.

2.2.1.8.2 Motors, starters, controls and wiring.

2.2.1.8.3 Distribution panelboards, branch motor feeders, disconnect switches.

2.2.1.8.4 Where electrical heating is used, power wiring from heating elements to power source shall be included.

2.2.1.9 Equipment Bases, Vibration Isolation Equipment, Concrete Pads and Duct Lining.

2.2.1.10 Sleeves, Hangers.

2.2.2 Thermal Environment - Objectives

2.2.2.1 Control and maintenance of air temperature within occupied space.

2.2.2.1.1 Heating

2.2.2.1.2 Cooling

2.2.2.2 Uniform air temperature at breathing line within the occupied space.

2.2.2.3 Adequate ventilation in occupied space.

2.2.2.3.1 Total air circulation

2.2.2.3.2 Outside air

2.2.2.3.3 Air distribution

2.2.3.4 Filtering and odor control

2.2.2.4 Equipment noise level below acceptable maximum for occupancy of space.

2.2.2.5 Simple and adequate control

2.2 SCOPE (Continued)

2.2.2 Thermal Environment - Objectives (Continued)

2.2.2.6 Rapid response of system to maintain thermal environment.

2.2.2.7 Safety of operation.

2.2.2.8 Comparative ease of alteration to conform to alterations in the spaces and their use.

2.2.2.9 Selectivity of temperature to suit activities.

2.2.3 Work excluded from this Sub-System

2.2.3.1 Electrical work which is not included in this Sub-System:

2.2.3.1.1 Service Entrance equipment and metering facilities.

2.2.3.1.2 Main service feeders to distribution panelboards supplied by this Sub-System, except as noted in 2.2.1.6.4.

2.2.3.2 Air supply, return and exhaust orifices, if these form a part of the Lighting-Ceiling Sub-System (the responsibility for specifications and approval thereof remains with the Atmosphere Sub-System Contractor).

2.2.3.3 Special exhaust systems such as fume hoods, appliance hoods, kitchen exhaust, automotive, etc.

2.2.3.4 Plumbing work which is not included in this Sub-System:

2.2.3.5 Basic building supply and distribution systems, including site work for water.

2.2.3.6 For other than kitchen and Automotive Shops.

2.2.3.6.1 Sanitary sewage.

2.2.3.6.2 Storm sewage.

2.3 DEFINITIONS

2.3.1 Air Distribution System

Equipment used for distribution of air, including fans, motors, controls, control wiring, fan casing, filters, ductwork, insulation, air supply outlets, air return or exhaust inlets and automatic temperature controls.

2.3.2 Heating System

Equipment used for converting energy into usable form for heating, including all associated pipes, coils, convectors, radiators, pumps, motors and controls, automatic controls, electric baseboard heaters with power wiring and conduit.

2.3.3 Cooling System

Equipment used for converting energy into usable form for cooling including all associated pipes, coils, pumps, motors, motor controls and automatic temperature controls.

2.3.4 Atmosphere Increment

2.3.4.1 The Atmosphere Sub-System shall be designed to serve a multiple of 4,000 sq. ft. units (the smallest increment of increase would be 4,000 sq. ft.) ideally, the area served shall vary from 7,000 to 10,000 sq. ft. For interface calculation purposes, this area shall be deemed to be approximately square with one side exposed to the outside.

2.3.4.2 This area shall be capable of being divided into at least ten independently controlled thermal zones.

2.3.4.3 In addition, it shall be possible within each area increment to independently control one zone of 200 sq. ft. each for 4,000 sq. ft. area.

2.3 DEFINITIONS (Continued)

2.3.4.4 For definition of air conditioning temperature, relative humidity, room pressure, air filter efficiency, refer to ASHRAE Guide - latest edition.

2.3.5 Air Conditioned Gross Area

For evaluation purposes, the gross areas for calculation of the air conditioning costs shall be the perimeter planning grid line.

2.4 PERFORMANCE TESTING

2.4.1 Air Balance reports shall be submitted for all systems.

2.4.2 Testing shall be done:

2.4.2.1 In rooms without furniture or equipment.

2.4.2.2 Work plane shall be 30" above floor.

2.4.2.3 Breathing line shall be 48' above floor.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS

2.5.1 The spaces are listed below in groups according to like atmosphere requirements. Such spaces will not be necessarily grouped into single buildings. Figures are based on the assumption that complete Schools will be built. Building of increments may cause variations in these percentages, but it is not anticipated that this variation will be significant.

2.5.1.1 Allocations of Types of Spaces

Space	Refer to Item
1. General Academic Includes Teaching Stations, Library, Teacher Work Rooms, Seminar Rooms, Academic Storage, Business Machine Rooms, Art Rooms Staff Rooms, Commons and contiguous circulation areas.	2.5.2

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.1.1 Allocations of Types of Spaces (Continued)

Space	Refer to Item
2. Automotive Includes:	2.5.3
Work areas tool and storage areas and contiguous circulation areas.	
3. Science Includes	2.5.4
Physics, Chemistry, Botany, Biology - all labs and prep rooms, Visual Arts, A/V-Workroom, Projection Rooms and Contiguous Circulation areas.	
4. Music Includes	2.5.5
Vocal and Instrumental areas including Practice Rooms and Contiguous Circulation areas.	
5. Administration and Guidance Includes	2.5.6
All offices, Health areas, Conference Rooms interchangeable, storage and work rooms and Contiguous Circulation areas.	
6. Industrial Arts Include	2.5.7
Industrial Arts Rooms, Home & Consumer Economics, Personal Service Lab, all school shops and contiguous circulation areas.	
7. General Purpose Includes	2.5.8
General Purpose Rooms, Gymnasia, Cafetoria Auditorium functions including adjacent stage facilities.	
8. Physical Services Includes	2.5.9
Locker and Change Rooms, Staff and Student Washrooms, Janitor Spaces.	
9. Food Service Includes	2.5.10
Kitchen space, serveries, staff dining.	

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.1.1 Allocations of Types of Spaces (Continued)

Space	Refer to Item
10. Miscellaneous	
1. Entrance vestibules	
2. Showers and Drying Areas.	
3. Storage areas (not contiguous to and interchangeable with Categories 1,2,3,4,5 and 6) stairs.	
4. Mechanical spaces.	

2.5.2 General Academic Space

2.5.2.1 Use:

Spaces usually referred to as classrooms, but include art, library, opportunity classes, teachers' workrooms, common space, seminar rooms. Activities are sedentary.

2.5.2.2 Structure

The maximum structurally unobstructed area will be approximately 8,000 sq. ft.

2.5.2.3 Flexibility Requirements

2.5.2.3.1 Interior Space

Spaces with no exterior wall must be capable of efficient service by the Atmosphere Sub-System. It is expected that interior space which is not serviced by mechanical cooling will form a very minor portion of any building.

2.5.2.3.2 Relationship to Ceiling

Mechanical systems resulting in exposed equipment in the ceiling shall be coordinated with the ceiling and lighting configuration, whether superimposed or structural and this Contractor shall coordinate with the Lighting-Ceiling Sub-System Contractor to ensure an efficient composite system of lighting, acoustics and air distribution.

2.5.2.3.3 Relation to Interior Space Division

Demountable partitions will not in general be available for use as vertical ducts. This does not rule out the possibility of the use of special partition type units as part of the mechanical system provided the planning flexibility requirements of the spaces can still be met. Any such unit shall relate to the partitions and if designed for flexible spaces, shall have the same order of flexibility as a demountable partition. Refer to Sub-System No. 4, Interior Space Division for further details of requirements in respect to partitions. No particular restrictions are placed on the thickness of such a mechanical unit.

2.5.2.3.4 Service Partitions

A system of demountable and fixed partitions will likely have hollow service panels to house the following serv ices: Light switches, communication system, TV jack, clock, telephone, thermostat if required, etc. This Sub-System Contractor shall install services relating to the control portion of the Atmosphere Sub-System. The panel will be supplied by the Interior Space Division Contractor. Design and location of cutouts for services shall be identical for interior space division and for interior face of vertical skin.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.2.3.5 Relationship to Floor

Mechanical systems resulting in penetration of the floor slabs must take into account the horizontal planning module and all fire prevention requirements.

2.5.2.3.6 Relationship to Vertical Skin

Vertical Skin units shall not in general be available for use as ducts. This does not rule out the possibility of the use of special panel type units as part of the Atmosphere Sub-System, provided the planning flexibility requirements of the spaces can still be met. Any such unit shall relate to the Vertical Skin and if designed for flexible spaces shall have the same order of flexibility as demountable partition. The Sub-System Contractor shall install components relating to the Atmosphere Sub-System in conjunction with the requirements of Sub-System No. 5 - Vertical Skin.

2.5.2.3.7 Rearrangement of Components

Planning flexibility does not rule out rearrangement of the distribution component within the space to achieve flexibility. Such rearrangement will be evaluated on the basis of ease of rearrangement by the CSP Director. Effects or appearance of space after rearrangement, functional effects on surfaces after rearrangement, and any other considerations that a specific rearrangement might entail will also be considered.

2.5.2.4 Lighting-Ceiling

2.5.2.4.1 Maximum input including lamp and ballast losses will not exceed 4 watts per sq. ft. of floor area, exclusive of special or supplementary lighting.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.2.4 Lighting-Ceiling (Continued)

2.5.2.4.2 Assemblies will include a ceiling throughout except that exposed structural members may be acceptable provided they present a finished fire resistant surface, are coordinated with the lighting components and meet the illumination and acoustical requirements of the Lighting-Ceiling specification. The ceiling or exposed structural system may assume shapes or forms other than a horizontal plane provided that horizontal ceiling elements are available within the system to receive partitions. The ceiling system will be designed to allow electrical service to be routed from the space above the ceiling directly into fixed or demountable partitions.

2.5.2.4.3 Except where structural members form the ceiling, ceiling system shall be designed so that access to the space above can be accomplished without damage or alterations to any component. The ceiling system shall acknowledge the requirements imposed by the Atmosphere Sub-System and allow for any necessary devices. Individual grilles or registers shall be provided by the Atmosphere Sub-System Contractor, but if such items as linear diffusers in the ceiling grid or perforated tile are required for mechanical purposes, these shall be furnished by the Lighting-Ceiling Sub-System Contractor to the requirements of, and coordinated with the Atmosphere Sub-System Contractor.

2.5.2.4.4 If the Lighting-Ceiling components perform mechanical functions, i.e. serving as plenums, ducts or portions of ducts or as diffusers, the Lighting-Ceiling Sub-System Contractor shall be responsible for the necessary sealing and shall cooperate with this Contractor in the balancing of the air supply. The capability of removing and/or utilizing lamp and ballast heat is a desirable feature. The prime responsibility for balancing of a system is with the atmosphere Contractor.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.2.5 Fire Protection Requirements

Ceiling plenums and ducts shall be constructed in accordance with the requirements of the following authorities having jurisdiction:

City of Detroit Fire Marshal
Department of Building & Safety Engineering of Detroit
Detroit Department of Health
Michigan Department of Health
Michigan Bureau of Industrial Hygiene

2.5.2.6 Acoustics

Permissible background noise level in these spaces shall not exceed NC 35.

2.5.2.7 Radiation

Electric baseboard radiation shall be provided and shall be sized to provide 25% of the room heat loss.

2.5.3 Automotive

2.5.3.1 Use

2.5.3.1.1 Repair, rebuilding and servicing of automobiles and engines.

2.5.3.1.2 Primarily shop type use, but may include some classrooms, staff areas and storage space.

2.5.3.1.3 Exhaust ventilation shall be provided in connection with all equipment and processes which create any dust, fumes, vapors or gases which may be injurious to health. Exhaust systems shall be separate from and independent of all other services and systems in the building.

2.5.3.1.4 Such systems (e.g. carbon monoxide collection) are not the responsibility of this Sub-System Contractor, but the system shall take into account the effect of any subsidiary system. The exhaust rate of flow shall be assumed to be a maximum of 50% of the supply air rate.

2.5.3.1.5 Provide heating and ventilation only, with provision of adding the cooling cycle at a future date.

2.5.3.2 Structure

Item 2.5.2.2 would apply generally. Structure in these areas may be exposed subject to meeting Fire Marshal's requirements which would be a two hour separation from all other parts of the building.

2.5.3.3 Flexibility Requirements

Space in this area will be fairly permanent. Plumbing walls, equipped benches and areas of heat producing equipment will remain in fixed locations. Corridors will not necessarily be defined by structure, lighting or ceiling height.

2.5.3.4 Lighting-Ceiling

Assume 4 watts per sq. ft.

2.5.3.5 Acoustic

Permissible background noise level shall not exceed NC45.

2.5.3.6 Exterior Walls

Shop area may have large exterior wall area with large doors to the outside. Provision shall be made to overcome the effect of these openings with the use of unitary equipment. Refer to drawings for overhead door sizes.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.4 Science

2.5.4.1 Use

2.5.4.1.1 This space involves laboratory and project spaces. Home Economics space is also included involving laboratory space and oversize learning centers. Science laboratory equipment and home appliance equipment is typical for these spaces.

2.5.4.1.2 Exhaust ventilation shall be provided in connection with all equipment and processes which create any dust fumes, vapors or gases which may be injurious to health. Exhaust fume systems serving this class of equipment and processes shall be separated from and independent of all other services and systems in the building.

2.5.4.1.3 Such systems (fume hoods, home appliance hoods, etc.) are not the responsibility of this Contractor, but his system within these areas shall take into account the effect of any subsidiary system therein. The exhaust rate of flow shall be assumed to be 50% of the supply air rate. Return air shall be calculated to maintain negative pressure in these spaces.

2.5.4.2 Structure - Similar to Item 2.5.3.2 generally in this Sub-System Specification.

2.5.4.3 Flexibility Requirements

This section will require limited flexibility. Plumbing walls, equipment laboratory benches and areas of heat producing equipment will be in fixed locations, but partitions not used for utilities may be rearranged. Corridors will not necessarily be defined by structure, lighting or ceiling height, but may be assumed to exist for mechanical purposes.

2.5.4.4 Lighting-Ceiling - Similar to Item 2.5.2.4.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.4.5 Acoustics

Permissible background noise level shall not exceed NC35.

2.5.4.6 Radiation - Similar to Item 2.5.2.7.

2.5.5 Music

2.5.5.1 Use

Choral, orchestral and individual or small group work.

2.5.5.2 Structure - Similar to Item 2.5.2.2.

2.5.5.3 Flexibility Requirements

Space in general will be fixed. Some flexibility may be involved, but this would only be interchangeable with other areas of other similar height.

2.5.5.4 Lighting Ceiling - Similar to Item 2.5.2.4

2.5.5.5 Acoustics

Permissible background noise level shall not exceed NC30. Duct lining or silencers may be required.

2.5.5.6 Radiation - Similar to Item 2.5.2.7.

2.5.6 Administration and Guidance

2.5.6.1 Use

Administrative offices including individual offices, general office space and staff rooms. Guidance space is primarily small offices. Activities are sedentary.

2.5.6.2 Structure - Similar to Item 2.5.2.2.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.6.3 Flexibility Requirements

Similar to 2.5.2.3. Some rooms may be required with individual control at 150 sq. ft.

2.5.6.4 Lighting-Ceiling - Similar to Item 2.5.2.4.

2.5.6.5 Acoustics - Similar to Item 2.5.2.6.

2.5.6.6 Radiation - Similar to Item 2.5.2.7.

2.5.7 Industrial Arts (Shop Areas)

2.5.7.1 Use

2.5.7.1.1 Primarily shop type use, but includes some classrooms, staff areas and storage space. In some instances, part of shop area may relate to art department.

2.5.7.1.2 Exhaust ventilation shall be provided in connection with all equipment and processes which create any dust, fumes, vapors or gases which may be injurious to health. Exhaust systems shall be separate from and independent of all other services and systems in the building.

2.5.7.1.3 Such systems (e.g. sawdust collection) are not the responsibility of this Sub-System Contractor, but the system shall take into account the effect of any subsidiary system. The exhaust rate of flow shall be assumed to be a maximum of 50% of the supply air rate.

2.5.7.2 Structure

Item 2.5.3.2 would apply generally. Structure in these areas may be exposed subject to meeting Fire Marshal's requirements which would be a two hour separation from all other parts of the building.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.7.3 Flexibility Requirements

Space in this area will be fairly permanent. Plumbing walls, equipped benches and areas of heat producing equipment will remain in fixed locations. Corridors will not necessarily be defined by structure, lighting or ceiling height.

2.5.7.4 Lighting-Ceiling - Assume 3.5 watts per sq. ft.

2.5.7.5 Acoustic

Permissible background noise level shall not exceed NC 45.

2.5.7.6 Exterior Walls

Shop area may have large exterior wall area with large doors to the outside. Provision shall be made to overcome the effect of these openings. Refer to drawings for overhead door size.

2.5.8 General Purpose Room

2.5.8.1 Use

Two basic functions: High degree of physical activity and at times assembly use.

2.5.8.2 Structure

This may or may not be system structure. Area may consist of a large space divided by operable wall or walls. The structure may be exposed, and exposed mechanical equipment may be acceptable at a high level in this space.

2.5.8.3 Flexibility Requirements

This section will be clearly defined by the structure. This area is not included in areas which must be capable of re-arrangement into many small spaces.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.8.4 Lighting-Ceiling

2.5.8.4.1 Lighting may be direct with ballast and lamp in the occupied space. Assume 4 watts per sq. ft.

2.5.8.4.2 Attention is drawn to the fact that nothing may project below the clear ceiling height given for these areas. Ceiling if applied, must be able to stand rugged usage in all of its component parts.

2.5.8.5 Acoustic:

Permissible background noise shall not exceed NC 45 for gymnasium function and NC 35 for auditorium or assembly function.

2.5.9 Physical Education (Locker and Change Rooms)

2.5.9.1 Use

2.5.9.1.1 Split by sexes for changing before and after P.T. classes.

2.5.9.1.2 Exhaust requirements shall be a minimum of 12 air changes per hour.

2.5.9.1.3 Supply and exhaust ventilation in locker rooms, particularly adjacent to showers shall be adequate to avoid vapor condensation. Exhaust duct shall be protected against corrosion or made of non-corroding material with sealed joints.

2.5.9.1.4 Provide heating and ventilation only.

2.5.9.2 Structure

Similar to Item 2.5.2.2 in this Sub-System Specification.

2.5.9.3 Flexibility Requirements

These spaces are likely to be fixed.

2.5.9.4 Lighting-Ceiling

Assume 2 watts per sq. ft. Note: Exposed mechanical equipment may be acceptable in these areas.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.9.5 Acoustic

Background noise level shall not exceed NC 45.

2.5.10 Food Service (Kitchen Type Space)

2.5.10.1 Use

2.5.10.1.1 Kitchen and snack bar capable of providing hot lunch and snack bar service for up to 1,000 persons. Kitchen and snack bar not necessarily in same location. Accommodation will be equivalent in standard to good quality commercial installation for the same facilities. Particular attention to be paid to exposed materials, i.e. non-corroding materials and finishes to be used.

2.5.10.1.2 Provide heating and ventilation only, except where shown on the drawings.

2.5.10.1.3 Air change shall not be less than 30 air changes per hour in food preparation and dishwashing areas. Refer to drawings for hood sizes and locations.

2.5.10.1.4 Exhaust systems serving kitchens shall be direct to the outside and separate from and independent of all services and systems in the building.

2.5.10.1.5 This Sub-System Contractor shall be responsible for the main system of ventilation in the area. Hoods and fans for specific heat producing appliances are not included, but the effect of these subsidiary systems shall be allowed for in the main system equipment design. The exhaust rate of flow shall be assumed to be a maximum of 100% of the supply air rate.

2.5.10.1.6 When single hoods are provided by others for kitchen exhaust, the velocity of air motion over the horizontal area of the hood will not be less than 100 feet per minute per sq. ft. for wall mounted hoods of 150 ft./min. per sq. ft. for island type hoods.

2.5 TYPES OF SPACE ACCORDING TO REQUIREMENTS (Continued)

2.5.11 Miscellaneous Spaces

2.5.11.1 Entrance Vestibules
- heated only.

2.5.11.2 Shower and Drying Areas
- exhaust, 12 air changes per hour.

2.5.11.3 Storage Areas and Stairs
- heated only.

2.5.11.4 Mechanical Spaces
- heated only.
- air supply as required by equipment.

2.6 DESIGN CRITERIA

2.6.1 Design Conditions

2.6.1.1 Heating

Spaces in Items 2.5.2; 2.5.3; 2.5.4; 2.5.5 and 2.5.6; 72°F dry bulb temperature, ± 2°F, 30% relative humidity at -10°F outside temperature; above 0°F outside temperature relative humidity shall be raised to reach 50% ± 5% at and above 32°F.

Space 2.5.7:	70°F ± 2°F
Space 2.5.8 & 2.5.10:	68°F ± 2°F
Space 2.5.9:	75°F ± 2°F
Space 2.5.8 (Auditorium):	72°F ± 2°F

Heat losses due to radiation, conduction, infiltration, ventilation and pressurization shall be accommodated.

Night, weekend and holiday temperature setback to 60°F should be included with warm-up capability to design temperature within three hours with outdoor air dampers in closed position.

Contiguous circulation space shall be treated appropriately.

2.6 DESIGN CRITERIA (Continued)

2.6.1.2 Cooling

Contiguous circulation space shall be treated appropriately.

2.6.1.2.1 Spaces in Items 2.5.2; 2.5.3; 2.5.4, 2.5.5 and 2.5.6: 78°F ± 2°F dry bulb, 50% ± 5% relative humidity.

Spaces in Items 2.5.7, 2.5.8; except gymnasium; 80°F ± 2°F dry bulb, 50% ± relative humidity.

Heat gains due to conduction, solar heat gain, sensible and latent heat gains from occupants, equipment or materials shall be accommodated.

2.6.1.2.2 Cooling design should be based on building occupancy. Paragraph 2.7.2.6.

2.6.1.2.3 The only areas which will be ventilated, without the provision of cooling, will be service cores, kitchen, locker rooms, automotive shop, washrooms, mechanical and electrical equipment and storage areas. Refer to drawings for detailed information.

2.6.1.3 Outside Design Temperature

Heating - Design temperature minus 10°F wind velocity 15 mph.
Cooling - 95° dry bulb, 75° wet bulb.
Uniform air temperature at breathing line within occupied space. Breathing line is defined as 48" above the floor and not less than 2' from the outside wall.

2.6.1.4 Adequate Ventilation in Occupied Space

2.6.1.4.1 Total Air Circulation - The total air circulation rate within a given zone shall be a maximum of the rates determined by the following criteria.

2.6.1.4.2 Calculate total heat gains from transmission, solar radiation and internal loads. Air flow rate shall be determined from cooling coil performance figures or by any other method. The temperature of the supply air shall not be lower than 20°F below the design room temperature.

2.6.1.4.3 Total air supply shall not be less than 30 cfm per person.

2.6.1.4.4 Total air supply rate shall be not less than the rate which may be required by codes and standards or by special ventilating conditions specifically called for elsewhere in this specification.

2.6.1.4.5 The average air supply shall be at least 1.00 cfm per square foot for each 4,000 square feet of gross area. The air distribution system shall be designed to allow increasing air circulation to 2.50 cfm per square foot, in any 1,000 foot square area within each 4,000 square foot with the following modifications:

2.6.1.4.5.1 Alterations to the branch duct system only.

2.6.1.4.5.2 Without alteration to the air handling units or to the main duct system.

2.6.1.4.6 The minimum air circulation should also comply with the following requirements:

	CFM/SQ. FT.
1. General Academic	1.00
2. Science	1.30
3. Music	2.00
4. Administration and Guidance	1.00
5. Industrial Arts	1.30
6. General Purpose	2.50

2.6.2 Outside Air, Air Distribution, Filtering and Odor Control

2.6.2.1 Outside Air

Supply a minimum of 8 cfm per person

2.6.2.1.2 Bidders shall bid exactly according to specifications but may submit an alternate system using fixed fresh air quantities providing not less than .15 cfm per sq. ft. of outside air is supplied to the air conditioned gross area at specified design conditions. A separate owning and operating cost calculation shall be provided based on this figure.

2.6.2.2 Air Distribution

Air motion passing over people within occupied space shall provide air velocities ranging between 25 and 50 fpm. Air not at the breathing line, but anywhere else where occupants may normally be conscious of air motion, air velocity (at a temperature difference not greater than 5°F from room temperature) may range up to 70 fpm.

2.6.2.3 Humidity

2.6.2.3.1 Maintain 50% ± 5% relative humidity during summer operation.

2.6.2.3.2 Humidity control shall be based on the 7,000 to 10,000 square foot incremental unit minimum.

2.6.2.4 Filtering

All air supplied to occupied space shall be passed through cleanable or replaceable air filters. Systems utilizing room air to temper supply air are acceptable without additional filtering, provided character of spaces is such that odor problems will not thereby be created. Filter efficiency shall be not less than 25% based on National Bureau of Standards dust spot test with atmospheric dust.

2.6 DESIGN CRITERIA (Continued)

2.6.2.5 Odor Control

2.6.2.5.1 Provide for sufficient odor-free outdoor air per pupil to assure adequate dilution of odors at all design conditions. Alternately recirculated room air that has been properly deodorized may substitute for all or part of the outside air used for odor control.

2.6.2.5.2 All equipment shall be arranged so that system can supply 100% outside air.

2.6.2.5.3 Bidders using this method of odor control shall describe for evaluation, their method of treating air. Importance of effective odor control is emphasized, particular attention shall be paid to Gymnasium, General Purpose Room, Kitchen, Home Economics, Laboratory and Locker Room areas.

2.6.3 Sound Levels

2.6.3.1 See notes in Items 2.5.2 to 2.5.10 relative to requirements for specific spaces in project buildings.

2.6.3.2 It is realized that noise in a system may be a fun ction of the general design of the building, causing awkward and constricted duct layouts, diffuser or return grille layout, or extreme velocities for the type of system. The bidder shall state his recommendations and limitations for his system to obtain good acoustical conditions.

2.6.4 Automatic Controls

2.6.4.1 Systems shall be capable of simple and adequate control to maintain the performance criteria called for in this specification at all weather conditions. Rooms shall have individual controls as required. Thermostats need not be operable from within the academic spaces. It is preferable that the occupants of a space do not casually adjust the thermostats.

2.6.4.2 The control systems shall be pneumatic, electronic or electric type or a combination of both.

2.6.4.3 The control system shall be capable of simple rearrangement, if necessary, to meet the demands of flexibility of academic spaces. However, the provisions for rearrangements should not require an extensive initial system. Part of the responsibility of the integrated design to be submitted by the bidder shall be to provide a system which will permit a great variety of possible rearrangements to be made without disturbing the finished surfaces and equipment.

2.6.4.4 At the same time, the design shall provide a system which does not require an extensive outlay of equipment, conduits, wiring and tubing which is not needed for the initial installation, but which must be installed to provide for the future rearrangements.

2.6.4.5 All sequences of the control cycle applicable to the specific systems utilizing pick-up heating, heating with minimum ventilation, maximum ventilation, cooling and mechanical cooling shall be sequence integrated and interlocked to provide specified control limits with fixed differential temperature during heating and cooling to prevent over-ride or excess suppression.

2.6.4.6 In the interests of flexibility, the thermostat may be located as follows: Either on demountable or fixed partition service panels, or exposed, or concealed in the ceiling of the occupied space, in a return air duct, directly accessible from the occupied space, or accessible through a hinged or easily removable panel, and capable of being reached from a ladder.

2.6.4.7 If a thermostat inaccessible from the occupied space is used, this contractor shall include some method of remote setting in his bid.

2.6.4.8 Control systems shall take into account perimeter zone conditions in relation to flexibility requirements of the system.

2.6 DESIGN CRITERIA (Continued)

2.6.5 Equipment Location

Equipment not specifically designed for roof top mounting without additional external protection shall be housed in a non-system penthouse. Servicing catwalks, ladders, if required, will be provided by this Contractor, unless otherwise indicated on the plans.

2.6.5.1 In general, roof mounted equipment shall occur not less than fifteen feet (15'-0") from the perimeter of a building, however, layouts in which ductwork or other equipment approach the perimeter or form a coordinated feature of the perimeter architectural character may be acceptable, subject to approval by the Owner.

2.6.5.2 Any roof mounted equipment must be subject to proven test which indicates that no short circuiting of air, which is detrimental to stated performance, occurs.

2.6.5.3 Where access to a low roof can be achieved by a door from an adjacent floor area, such access may be used and a charge of $500.00 will be made for evaluation purposes.

2.6.6 Exposed Mechanical Equipment

2.6.6.1 Mechanical equipment or components, which are exposed on building interiors and exterior shall be well organized and detailed.

2.6.6.2 It is not felt that the size of exposed equipment is a significant factor in their architectural acceptability, and Sub-System Contractors are advised not to penalize mechanical functional efficiency or economy of equipment in the interests of size reduction. Besides equipment itself, the arrangement of equipment is visually critical. Arrangements which form a direct expression of a regular and consistent mechanical system are to be preferred. All exposed equipment in design and layout shall be subject to approval by the Owner.

2.6 DESIGN CRITERIA (Continued)

2.6.6.3 Chimneys

This Sub-System shall provide a proper conduit to the atmosphere for the discharge of the combustion gases. Bidder shall offer a stack with the requisite support within the building and which shall be self-supporting above the roof to the height required by local codes without guying Unit prices shall be quoted:

1. For stack of roof origin in dollars per lineal foot.
2. For stack originating within the building in dollars per lineal foot.

2.6.6.4 Door and wall grilles where required, are the responsibility of this Sub-System. Interface with Sub-System No. 4 - Interior Space Division for required openings and mounting.

2.6.6.5 Operable control louvers at the exterior are the responsibility of this Sub-System Exterior decorative louvers with bird screen are the responsibility of Sub-System No. 5 - Vertical Skin.

2.6.7 Attachments

Attachment, support, other than main structure and weather-proofing of mechanical equipment shall be the responsibility of this Contractor.

2.6.8 Coordination with Non-System - Plumbing

2.6.8.1 All necessary water and drain connections required by this Sub-System shall be coordinated with the Plumbing to form a complete integral atmosphere and plumbing system for each school.

2.6.8.2 In general, the plumbing shall provide water supply connections at the required pressure, size and capacity and drain connections complete with traps and vents to mutually agreed points near atmosphere equipment. This Sub-System shall make all connections to equipment.

2.6 DESIGN CRITERIA (Continued)

2.6.9 Fuel Supply for Heating Systems

2.6.9.1 Provide complete fuel supply and distribution system for the heating system for each school.

2.6.9.2 Natural gas supply system, if required, shall be provided complete with meter, pressure regulating station and other components located at approved locations.

2.6.9.3 For electric supplemental heating, power wiring from heating elements to the main incoming service switchboard shall be provided. Supply and install distribution transformers, switchboards, panelboards, associated control equipment, feeders and branch circuit wiring.

2.6.10 Electrical Equipment and Wiring

2.6.10.1 This Sub-System Contractor shall supply and install motors, motor starters, contactors, disconnects, fuses, pilot devices, electric heating elements, and all auxiliary control equipment to complete the Sub-System.

2.6.10.2 This Sub-System Contractor shall do all control wiring between all pilot devices, motor starters, contactors, etc. to complete the Sub-System.

2.6.10.3 This Sub-System Contractor shall do all power wiring from the main switchboard through starter and contactors to motors and heaters.

2.6.10.4 The distribution panelboard servicing Sub-System equipment shall be supplied and installed by the Sub-System Contractor.

2.6.10.5 If 120/208 volt is required by the Sub-System, distribution transformers shall be supplied and installed.

2.6.10.6 Distribution panel breakers shall meet system interrupting requirements, fuses shall be time delay type.

2.6.10.7 Class II, Group C, Motor Control Center shall be used when more than 6 starters are located in a single room.

2.7 BIDDING REQUIREMENTS

2.7.1 General Design

Refer to environmental criteria for various areas. Assumed lighting level shall be 3.5 watts per square foot, including ballast losses.

2.7.1.2 Description of Atmosphere Sub-System.

2.7.1.3 Location and layout of major equipment and distribution system.

2.7.1.4 Approximate weights of equipment, making allowance for impact loading and means of load distribution, vibration isolation, including floating slabs.

2.7.1.5 Indication of spaces and areas occupied by equipment and cross sections of critical shafts and branch take-offs to ceiling spaces or below floor slabs.

2.7.1.6 Means of introducing air into space.

2.7.1.6.1 Air distribution module.

2.7.1.6.2 Flexibility for changing air distribution system.

2.7.1.7 Factors involved in the control of a system will be used as one of the bases for evaluation of competing systems. A statement of the recommended control procedure shall be submitted as part of this bid, for evaluation by the Owner.

2.7.1.7.1 Flexibility of changing of control of temperature and humidity; possibility of rearranging controllers, means of adjusting control set-points.

2.7.1.7.2 State method of achieving easy, quick relocation of control components.

2.7.1.8 All data necessary to evaluate equipment performance; in graphic form, indicate for fans, pumps:

- points of equipment selection
- run-out horsepower
- efficiencies
- sound power levels and vibration generated by rotating equipment.

2.7 BIDDING REQUIREMENTS (Continued)

2.7.1.9 Characteristics of construction and equipment materials concerning strength of materials, corrosion resistance, type of lubrication required.

2.7.1.10 Type of materials used for distribution, such as ductwork material and piping material.

2.7.1.11 Type and location of instruments for observing and maintaining overall control of Sub-System performances (e.g., pressure and temperature indication).

2.7.1.12 Means and type of removal of accumulated dirt and other obstructions (e.g., filters, strainers, air vents).

2.7.1.13 Means provided for prevention of flooding (e.g. water curbs, drip pans, drains).

2.7.1.14 Chemical treatment required to prevent corrosion and deterioration, complete flow and control diagrams.

2.7.1.15 Complete air and water flow diagrams, automatic control diagrams, electric power and control wiring diagrams.

2.7.2 Annual Owning and Operating Cost

2.7.2.1 The following annual owning and operating cost calculation shall be submitted from each bidder on the forms provided (F-1, F-2). This estimate will be subject to review by the Owner. If, in the opinion of the Owner the estimate has been incorrectly calculated, or if the bidder has introduced assumptions not previously approved, and is considered unreasonable by the Owner, The Bidder may be disqualified.

2.7.2.1.1 Attach detail calculations for each item.

2.7.2.2.1 The entire air conditioned gross area shall be considered to be air conditioned with areas specifically not requiring treated air being deducted from the gross area and tabulated.

2.7.2.2.2 Indicate floor space required for mechanical rooms in the proposed installation. Cost shall be allotted to the Sub-System for comparative evaluation as follows.

1. Space occupied inside building or inside penthouse provided Owner: $20.00 per square foot.
2. Space occupied on roof (Bidder provides Enclosure): $2.50 per square foot.
3. Cost of Chimneys.

2.7.2.2.3 Capital Cost: 20 years at 6% interest rate, i.e. 8.7% owning cost per year.

2.7.2.2.4 Additional Building Data:

1. Lighting level: 3.5 watts/sq. ft. gross
2. U-factors, wall and roof: 0.15
3. U-factor, windows, double glazed: 0.58
4. Maximum average vertical skin heat gain: 17 BTUH/sq.ft./4000 sq. ft.
5. Ventilation rate: 1.25 air changes per hour.
6. Domestic hot water energy: 200 million BTU per year.

2.7.2.3 Fuel Costs:

1. Gas: 65 per Mcf: net
2. Electric: 1.8¢ per KWH - all electric for supplemental perimeter heating.

2.7.2.4 Fuel Efficiencies (assumed seasonal)

Gas: 75%
Electric: 98%
Electric power for mechanical equipment: fans, pump, etc. as required.

2.7 BIDDING REQUIREMENTS (Continued)

2.7.2.5 Season: Heating - 6232 degree - days
Cooling - 1000 full load hours

2.7.2.6 Building Occupancy:

Month	Days/Week	Hours	Occupancy
Sept. - June	5	8 a.m. - 4 p.m.	Full
		4 p.m. - 10p.m.	Half
July - August	5	8 a.m. - 5 p.m.	Half
		4 p.m. - 10p.m.	Half

Ventilation rate shall be based on occupancy.

2.7.2.7 Calculations shall be submitted for each of the four schools:
Cooley School
Sherrard School
Boynton School
Cerveny School
based on systems drawings.

2.7.3 Details and Unit Prices

2.7.3.1 The Contractor shall furnish to the CSP Director the following information related to the lump sum bid for the specified types of space:

2.7.3.1.1 The installed unit price for each component.

2.7.3.1.2 The installed unit price on a linear basis for services required by components.

2.7.3.1.3 The total installed cost of each Sub-System.

2.7.3.1.4 The total installed cost of all Sub-System components at the unit prices quoted shall not be greater than the lump sum tender of this Contract.

2.7.3.2 Data on limitations of use and recommended combinations of components combined with components of the Lighting-Ceiling Sub-System to achieve the specified performance.

2.7 BIDDING REQUIREMENTS (Continued)

2.7.3.3 The Sub-System Contractor shall provide an inventory of all parts and components that require regular maintenance.

2.7.3.4 Indicate the type of inspection and routine maintenance and the frequency.

2.7.3.5 All equipment sizes and nature shall be selected to ensure that they be unclassified insofar as the City of Detroit, Department of Building & Safety Ordinance Numbers 278E, 461E, 415E, and 279E.

2.7.4 Bidding Sheets

2.7.4.1 Bidders shall complete bidding sheets.

2.7.4.2 In order to establish unit prices, Bidders shall also complete bidding sheets for each individual school.

Firm Name_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 2

SUB-SYSTEM NO. 2 - ATMOSPHERE

(Submit in duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 2 Work - Atmosphere

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. The sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the sum of _____
Base Bid. Said sum to be subject to all of the terms of the contract and to include all [illegible] specifications applicable thereto.

Proposal No. 2 (Continued)

P.3 INTERFACING BIDDER BY CHOICE — PRICE ADJUSTMENT
(cont)

Re Sub-System No. 1 - Structure

1st _____	BASE BID _____
2nd _____	$ _____
3rd _____	$ _____

Re Sub-System No. 3 - Lighting-Ceiling

1st _____	BASE BID _____
2nd _____	$ _____
3rd _____	$ _____

Re Sub-System No. 4 - Interior Space Division

1st _____	BASE BID _____
2nd _____	$ _____
3rd _____	_____

Re Sub-System No. 5 - Vertical Skin

1st _____	BASE BID _____
2nd _____	$ _____
3rd _____	$ _____

P.4 All work covered by the following Addendum is included with this Proposal.

The Base Bid shall include:

Addendum No._____, dated _____

Addendum No._____, dated_____

Addendum No._____, dated_____

P.5 In compliance with instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master C.P.M. program [illegible] the Owner.

Proposal No. 2 (Continued)

P.6 The following Separate Prices are not included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($_____)

2) Cerveny School Addition

The sum of _____ Dollars ($_____)

3) Sherrard School Addition

The sum of _____ Dollars ($_____)

4) Delbert E. Roberts Addition to Cooley School

The sum of _____ Dollars ($_____)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead and profit, and shall be applied to the net differences in quantities.

The following unit prices are to be used as a basis for negotiating additions and/or deductions to the contract:

P.7.1 Number and Description of Unit Prices

Space Type	Refer to Item	Sq. Ft. Gross	Control Zones	Lump Sum	(Unit Price $/sq. ft.)
General Academic	2.5.2	_____	_____	$_____	_____
Automotive Shop	2.5.3	_____	_____	$_____	_____
Science	2.5.4	_____	_____	$_____	_____
Music	2.5.5	_____	_____	$_____	_____
Admin & Guidance	2.5.6	_____	_____	$_____	_____
Ind. Arts(Shops)	2.5.7	_____	_____	$_____	_____
Gen.Purpose Rooms	2.5.8	_____	_____	$_____	_____
Physical Education (Locker & Change)	2.5.9	_____	_____	$_____	_____
Food Service (Kitchen)	2.5.10	_____	_____	$_____	_____
Misc. Spaces	2.5.11	_____	_____	$_____	_____
5 Year Service Contract with Option for 10 years.					
Total		_____	_____	$_____	_____

Proposal No. 2 (Continued)

P.7.1 Number and Description of Unit Prices (Continued)

The sum of _____

_____ Dollars ($_____)

OPERATORS' AND MAINTENANCE COST

NOTES:

1. Attach detailed Calculations for Each Item, Add any Item not listed but necessary for Guarantee.
2. Include Summary of Cost.

OPERATOR'S COST

Custodial Maintenance $/Yr._____

Full Time Maintenance $/Yr._____

OPERATOR'S COST $/Yr._____

MAINTENANCE COST

For the First 5 Years.

1. Replacement of all parts including refrigerant fluid $_____
2. Routine maintenance, such as lubrication, filter changing water treatment, automatic control adjustments, etc. $_____
3. Emergency Contract $_____

TOTAL FOR FIRST 5 YEARS $_____

MAINTENANCE COST $/Yr._____

OPERATORS' AND MAINTENANCE COST $/Yr._____

Proposal No. 2 (Continued)

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals shall be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bonds and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.10 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1._____

2._____

3._____

c. ( ) Corporation, incorporated under the state laws of

_____.

P.11 The undersigned does hereby declare and stipulate that this proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date

_____

In the Presence of

_____

Firm Name

_____

By_____

Title_____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the proposal shall be declared irregular).

SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 3 - LIGHTING - CEILING

ITEM		PAGE NO.
3.1	CONTRACT DOCUMENTS	III-3-1
3.2	SCOPE	III-3-1
3.3	COMPONENTS	III-3-2
3.4	CEILING PROPERTIES	III-3-2
3.5	DIMENSIONAL CRITERIA	III-3-5
3.6	DESIGN CRITERIA	III-3-6
3.7	ATTACHMENT OF CEILING	III-3-10
3.8	PASSAGE OF SERVICES	III-3-11
	PROPOSAL No. 3	III-3-P1

SUB-SYSTEM NO. 3 - LIGHTING - CEILING

3.1 CONTRACT DOCUMENTS

Parts I, II and III are part of this Specification.

3.2 SCOPE

3.2.1 Work Included

3.2.1.1 Finished acoustical and light reflecting surfaces

3.2.1.2 Suspension systems

3.2.1.3 Lighting elements and lamps

3.2.1.4 Junction boxes for connection to lighting elements and wiring from lighting elements to junction boxes.

3.2.1.5 Ballasts and ballast wiring

3.2.1.6 Acoustical control

3.2.1.7 Fireproofing, as required for Structure Sub-System

3.2.1.8 Trim, clips, spacers, etc.

3.2.1.9 Air handling orifices which are integral for the Lighting-Ceiling Sub-System as required by the Atmosphere Sub-System.

3.2.1.10 Provision for passage of mechanical, structural, electrical and other building elements.

3.2.1.11 Closure panels above the ceiling over partitions, as required for light, acoustical or fire separation.

3.2.2 Work Excluded from this Sub-System

Panel Boards

Supply Feeders to Junction Boxes

Switches

Receptacles

Special Lighting

3.3 COMPONENTS

3.3.1 A completely flexible connection system shall be provided between lighting elements with grounded receptacles and caps suitable for 277 volts single phase. Each element shall be provided with recessed female receptacle and portable cord with male cap. Cord to be six feet in length.

3.3.2 The Sub-System shall include all closure panels or baffles above the ceiling plane necessary to meet the requirements of sound attenuation and fire ratings and to prevent light leakage from one room to another. Closure panels shall have the same degree of movability as the demountable partitions.

3.3.3 Termination of this Sub-System against permanent vertical planes, expansion joints or similar conditions shall be achieved with the visually and structurally compatible trim.

3.3.4 If the compatible Atmosphere Sub-System requires insulation in the ceiling plane for the proper functioning of that system, the insulation shall form part of this Sub-System.

3.4 CEILING PROPERTIES

3.4.1 All reflecting ceiling surfaces shall be white and shall provide a reflectance value of not less than 80%, the exact shade of white to be selected by the Owner. Reflectance value shall be determined by means of a Baumgartner type spherical reflectometer.

3.4.2 All metal surfaces shall be coated with a minimum conversion coating of electro plated zinc to a thickness of .02 mils. All exposed metal surfaces shall also have a baked enamel finish of a minimum of 0.9 mils thickness.

3.4.3 Hardware shall have a non-corrosive finish with a designed in-service life in keeping with the assemblies and sub-assemblies of which it is a part.

3.4.4 Sound absorbing properties of the ceiling panels shall not be reduced materially when painted with a non-bridging paint.

3.4 CEILING PROPERTIES (Continued)

3.4.5 Light reflectance value of the ceiling panels shall not be reduced by more than 5% when cleaned in accordance with this Contractor's instructions.

3.4.6 Provided that the acoustic and illumination requirements are met, this Sub-System may provide the fireproofing as required for the Sub-System No. 1 - Structure. In that case, the total assembly of Lighting-Ceiling and Structure shall provide the one and two hour rating as required. Rating tests shall be performed in accordance with ASTM E 119-67 by an agency approved by the Owner.

3.4.7 Ceiling panels shall have a flame spread rating of 25 or less, fuel contributed 35 and smoke developed 50. Rating tests shall be performed in accordance with ASTM E84-81 by an agency approved by the Owner and the Office of the State Fire Marshal.

3.4.8 Lenses shall be of virgin acrylic plastic and shall be in accordance with the "Tentative Guide Line for Use of Formed Plastic Materials" by the State Fire Safety Board, East Lansing, Michigan.

3.4.9 In general, the ceiling assembly shall have a rating of STC 35-39 for one layer when tested as a partition in accordance with AMA 1-11. Rating tests shall be performed by an agency approved by the Owner and shall include a typical assembly proposed for this system. In Music areas adjacent to a Teaching space, the ceiling assembly shall have a rating of STC - 42 for one layer when tested as indicated above.

3.4.10 This Sub-System shall provide for 2 levels of sound absorption:

3.4.10.1 <u>Level AC-1</u>:

This Lighting-Ceiling Assembly shall contribute a minimum absorption of 0.50 and a maximum of 0.70 sabins per square foot of projected ceiling area at 500 cps.

3.4.10.2 Level AC-2

This Lighting-Ceiling Assembly shall contribute a minimum absorption of 0.15 and a maximum of 0.35 sabins per square foot of projected ceiling area at 500 cps.

3.4.10.3 Rating tests shall be performed in accordance with ASTM C423-66 for mounting No. 7 by an agency approved by the Owner.

3.4.11 If the specified absorption is not inherent with the lighting ceiling assembly, this Contractor shall be responsible for the supply and installation of supplementary acoustical components to achieve the specified levels. The supplementary components shall be coordinated visually and dimensionally with the Lighting-Ceiling Sub-System.

3.4.12 The Sub-System design shall permit the installation of supplementary lighting consisting of an incandescent lighting element within the 5' x 5' planning grid and it shall be possible to wire these supplementary elements to the adjacent junction box. Supplementary lighting element may consist of a surface mounted or suspended exit light.

3.4.13.1 If fluorescent lamps are used, they shall be rapid start.

3.4.13.2 Ballasts shall be ETL certified to meet CBM specification, Class P, Underwriters Labeled and to have "A" sound rating. Ballasts shall be suitable for 277 volt, 60 cycle, single phase operation.

3.4.13.3 Ballasts shall have electrical characteristics to insure satisfactory performance of the specified fluorescent lamps and shall meet the applicable requirements of the latest edition of USAS C82.1 on USA Standard Specifications for Fluorescent Lamp Ballasts.

3.4.14 Photometric Testing

3.4.14.1 The testing shall be performed by either the Electrical Testing Laboratory of New York, New York or the Independent Testing Laboratory of Boulder, Colorado. Test results shall be submitted with the bids.

3.4 CEILING PROPERTIES (Continued)

3.4.14.2 Photometric measurements for Visual Comfort Probability (VCP) shall be performed in accordance with the requirements of the Illuminating Engineering Society's standard procedure for computing Visual Comfort Ratings for Interior Lighting.

3.4.14.3 Lamps shall be standard cool white fluorescent and shall have 200 burning hours prior to testing.

3.4.14.4 Average illumination levels as specified hereafter shall be verified in a room according to I.E.S. methods: "Regular area with Symmetrically Spaced Luminaires in tow or more rows," I.E.S. Handbook, 4th Edition, pp. 4-20, 4-21.

3.5 DIMENSIONAL CRITERIA

3.5.1 The layout and configuration of the Sub-System shall allow column locations on the 5' x 5' planning grid without deleting the lighting capability over an area of more than 25 square feet.

3.5.2 The Sub-System shall allow a lighting element to be installed within each 5' x 5' planning grid, and shall permit partitioning at the module mid-point parallel to one of the grid lines.

3.5.3 If exposed suspension members are used, the width of these members shall be 4" maximum.

3.5.4 The Sub-System shall provide for steps, in ceilings and for ceiling areas lower than the normal ceiling plane, including vertical closure panels. Vertical panels shall be visually and structurally compatible with the Sub-System and the Interior Space Division Sub-System.

3.5.5 The horizontal elements of the Sub-System required to receive and support the partitions shall be level within the tolerances permitted in ASTM Specification C636-69.

3.6 DESIGN CRITERIA

3.6.1 General

3.6.1.1 The ability to rearrange Lighting-Ceiling components within the 5' x 5' planning grid, is a major design requirement. It shall be possible to rotate a lighting element through 90° within the 5' x 5' grid. The rearrangement characteristics shall be such that all service requirements may be accommodated.

3.6.1.2 No Lighting-Ceiling elements shall protrude below the interface plane between the Lighting-Ceiling Sub-System in the Interior Space Division Sub-System.

3.6.1.3 If building elements other than the Lighting-Ceiling Sub-System serve as the finished ceiling surface, i.e. exposed structure, it shall be the responsibility of this Contractor to insure that the specified acoustic and reflectance levels are met.

3.6.1.4 The Sub-System components may assume shapes or forms other than horizontal planes, provided that horizontal elements are available within the Sub-System to receive partitions.

3.6.1.5 The Sub-System shall be designed so that access to the ceiling space above may be accomplished easily and without damage or alteration to any component.

3.6.1.6 Lighting elements shall be interchangeable with ceiling panels without alteration to the suspension system.

3.6.2 Lighting Classification L-1

3.6.2.1 Areas included under this classification are basically those in which the horizontal task is the critical one. See plans for all areas included.

3.6.2.2 The following design conditions specify the physical space characteristics within all L-1 Lighting-Ceiling assemblies upon which all photometric performance tests shall be based.

3.6 DESIGN CRITERIA (Continued)

3.6.2 Lighting Classification L-1 (Continued)

3.6.2.3 Room Dimensions: Width - 25'-0", Length - 30' - 0", Height - 10'-0". These dimensions provide width, length and ceiling height dimensions of the room for Visual Comfort Probability ratings and for illumination level calculations.

3.6.2.4 Reflectance Values:

Ceiling 80% (non-luminous elements); walls 50%, floors 30%.

3.6.2.5 The Visual Comfort Probability rating for all L-1 Lighting_ Ceiling assemblies shall be a minimum of 70 for the design conditions for the room specified in article 3.6.2.3 and applying thereto the reflectance values of articles 3.6.2.4, for luminaries lengthwise and crosswise at an illumination level of 70 foot-candles. Luminance (photometric brightness) limitations for the luminaries for the design conditions shall conform with the requirements of the "scissors curve" as outlined in I.E.S. Handbook, 4th Edition, pp 11-3, 11-4.

Crosswise and lengthwise average luminance distribution shall comply with the scissors curve graph (I.E.S. Handbook, P 11-4).

Ratio of the maximum to average luminaire-luminance shall preferably not exceed 3:1 and in no case shall it exceed 5:1.

The maximum luminance shall not exceed three times the limiting average of the graph.

Angle from Nadir	Luminance
45°	2250
55°	1605
65°	1125
75°	750
85°	495

3.6 DESIGN CRITERIA (Continued)

3.6.2 Lighting Classification L-1 (Continued)

The average illumination at a plane 30" above the floor shall not be less than 70 foot candles maintained. A maintenance factor of 0.70 shall be used for calculation and test measurement purposes.

3.6.2.6 Connection system shall permit control of three levels of illumination: fully off, half on and fully on. With half on control lighting elements illuminated shall form a symmetrical arrangement.

3.6.2.7 Maximum input including lamp and ballast losses shall not exceed 4 watts per square foot of floor area exclusive of special or supplementary lighting.

3.6.2.8 A lighting element shall be contained within each 5'-0" x 5'-0" module.

3.6.2.9 It shall also be possible to meet all requirements of the L-1 classification with the ceiling heights indicated.

3.6.3 Lighting Classification L-2

3.6.3.1 Areas included under this classification are basically those in which there is no critical task. See Plan for areas included.

3.6.3.2 The following design conditions specify the physical space and characteristics within which L-2 Lighting-Ceiling assemblies shall meet the design requirements. This space shall exclude all daylight.

3.6.3.3 Reflectance values: Ceiling 70% (non-luminous elements), walls 30%, floors 10%.

3.6.3.4 The Lighting-Ceiling shall have a symmetrical layout of lighting elements to provide a minimum level of 30 foot candles of illumination with a maximum brightness of 1000 foot lamberts, 0-45° from nadir.

3.6 DESIGN CRITERIA (Continued)

3.6.3 Lighting Classification L-2 (Continued)

3.6.3.5 A maintenance factor of 0.70 shall be used for calculations and test measurement purposes.

3.6.3.6 Connection system shall permit control of three levels of illumination: fully off, half on, and fully on.

3.6.3.7 If incandescent lighting elements are used, shielding media shall provide a cutoff from horizontal of 45° minimum.

3.6.4 Lighting Classification L-3

3.6.4.1 Areas included under this classification are basically those in which the critical task is the ability to move about in safety. See plans for areas included.

3.6.4.2 The Lighting-Ceiling assembly for this classification shall be similar to L-1 except that articles 3.6.2.5 and 3.6.2.6 do not apply.

3.6.4.3 The Lighting-Ceiling shall have a symmetrical layout of lighting elements to provide a minimum maintained level of 30 foot-candles of illumination, at 30" above the floor.

3.6.5 Lighting Classification L-4

3.6.5.1 Areas included under this classification are indicated on plans.

3.6.5.2 The Lighting-Ceiling assembly for this classification shall be similar to L-1 except that articles 3.6.2.5 and 3.6.2.6 shall not apply.

3.6.5.3 The lighting-ceiling shall have a symmetrical layout of lighting elements to provide a minimum maintained level of 50 foot candles of illumination.

3.6 DESIGN CRITERIA (Continued)

3.6.7 Annual Operating Cost

3.6.7.1 The annual operating cost calculation shall be submitted with each bid on the forms provided. The estimate will be subject to review by the CSP Director and the estimate shall be based on the following assumptions:

Electrical assumption:

- rate 1.8¢ per KWH

Building Occupancy (Minimum):

Month	Days/Week	Hours	Occupancy
Sept - June	5	8a.m. - 4p.m.	Full
		4p.m. - 10p.m.	Half
July - August	5	8a.m. - 4p.m.	Half
		4p.m. - 10p.m.	Half

Lamps

Annual replacement cost for lamps including labor based on the rated life of lamps. The rated lamp life for fluorescent and mercury lamps shall be based on 3 hours per start.

3.7 ATTACHMENT OF CEILING

3.7.1 All attachments shall be concealed and shall permit the Lighting-Ceiling elements to be relocated readily.

3.7.2 The structural system shall provide support capability for Lighting-Ceiling Sub-System at 5' on center in both directions.

3.7.3 The Sub-System shall not require any modifications to the building system other than the addition of attachments for the support of this Sub-System.

3.7 ATTACHMENT OF CEILING (Continued)

3.7.4 The Sub-System shall have the capability to receive and transmit a lateral load of 50 lbs. "At any point" at the top of all partitions, relocatable, operable and fixed, for interior space division Sub-System to the Structure Sub-System.

3.7.5 Partition attachments shall be accommodated at no greater distance than 5' on center in two directions parallel to the grid lines.

3.8 PASSAGE OF SERVICES

3.8.1 The ceiling system shall permit services to be routed from the space above the ceiling directly into fixed and demountable partitions.

3.8.2 The Lighting-Ceiling Sub-System shall provide space and clearance to permit wiring, raceways and conduits to be concealed.

3.8.3 The Sub-System shall acknowledge and accommodate the requirements imposed by the Atmosphere Sub-System. Supply and return air orifices shall form part of this contract, if they form an integral part of the design, but shall be designated in cooperation and approved by the Atmosphere Contractor.

3.8.4 If the Sub-System performs mechanical function (i.e. serving as plenum duct or diffuser) this contractor shall be responsible for the required sealing, and shall cooperate in the balancing of the air supply.

3.8.5 If plenum sub-divisions are required by the compatible Atmosphere Sub-System, they shall be the responsibility of this Contractor.

3.8.6 The Sub-System shall acknowledge and accommodate the requirements imposed by a Sprinkler system.

3.8.7 The Sub-System shall acknowledge and accommodate public address system speakers.

Firm Name _____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 3

SUB-SYSTEM NO. 3 - LIGHTING-CEILING

(Submit in duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 3 Work - Lighting-Ceiling

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. The sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____ Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

Proposal No. 3 (Continued)

P.3 (cont) INTERFACING BIDDER BY CHOICE — PRICE ADJUSTMENT

Re Sub-System No. 1 - Structure

1st _____ Base Bid _____

2nd _____ _____

3rd _____ _____

Re Sub-System No. 2 - Atmosphere

1st _____ Base Bid _____

2nd _____ _____

3rd _____ _____

Re Sub-System No. 4 - Interior Space Division

1st _____ Base Bid _____

2nd _____ _____

3rd _____ _____

P.4 All work covered by the following Addendum is included with this Proposal. The Base Bid shall include:

Addendum No._____, dated _____

Addendum No._____, dated _____

Addendum No._____, dated _____

Addendum No._____, dated _____

P.5 In compliance with instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master C.P.M. progress schedule prepared by the Owner.

Proposal No. 3 (Continued)

P.6 The following Separate Prices are included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition:

The sum of _____ Dollars ($_____)

2) Cerveny School Addition

The sum of _____ Dollars ($_____)

3) Sherrard School Addition

The sum of _____ Dollars ($_____)

4) Delbert E. Roberts Addition to Cooley School

The sum of _____ Dollars ($_____)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead and profit, and shall be applied to the net differences in quantities.

The following unit prices are to be used as a basis for negotiating additions and/or deductions to the contract:

P.7.1 Number and Description of Unit Prices

Lighting Classification	Acoustic Level	Area Sq. Ft.	Cost ($)	Unit Price $/Sq. Ft. Add	Deduct
L1	AC1				
L1	AC2				
L2	AC1				
L2	AC2				
L3	AC1				
L3	AC2				
L4	AC1				
L4	AC2				

Proposal No. 3 (Continued)

P.7.1 Number and Description of Unit Unit Prices (Continued)

_____ square feet of vertical closure
Panels installed (See 3.3.2

$_____

Unit price per square foot installed $_____

_____square feet of 12"
deep vertical panels to accommodate
a lower ceiling area (See 3.5.4) $_____

Unit price per square foot installed $_____

_____square feet of 24"
deep vertical panels to accommodate
a lower ceiling area (See 3.5.4) $_____

Unit price per square foot installed $_____

_____square feet of
ceiling panel (See 3.6.1.6) $_____

Unit price per square foot installed $_____

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bonds and the Labor and Materials Payment Bond are to be included in Proposal Sum.

Proposal No. 3 (Continued)

P.10 The un dersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions, and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1._____

2._____

3._____

c. ( ) Corporation, incorporated under the state laws of_____.

P.12 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date

_____

In the Presence of

_____

Firm Name

_____

By_____

Title_____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal, otherwise the proposal shall be declared irregular).

SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 4 - INTERIOR SPACE DIVISION

C O N T E N T S

ITEM		PAGE NO.
4.1	CONTRACT DOCUMENTS	III-4-1
4.2	SCOPE	III-4-1
4.3	RELOCATABLE PARTITIONS	III-4-2
4.4	JOINTS	III-4-12
	PROPOSAL NO. 4	III-4-P1

SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 4 - INTERIOR SPACE DIVISION

4.1 CONTRACT DOCUMENTS

Parts I, II, III of the Contract are a part of this specification.

4.2 SCOPE

4.2.1 Work Included

- Relocatable partitions and related work including doors, frames glass and glazing.
- Installation only of door hardware for relocatable partitions.
- Attachment system for accessory items.
- Other work herein excluded as may be offered as an option such as fixed partitions.

4.2.2 Work Excluded from this Sub-System

- Electrical elements.
- Plumbing elements.
- Fixed partitions including doors and frames located in same.
- Panel Type Operable partitions.
- Accordian Type Operable partitions.
- Mechanical elements.
- Accessory elements which may be attached to the partition system such as:
  - bookshelves
  - fire extinguisher cabinets
  - acoustical or light baffles above the ceiling plane
  - accessory writing and tack panels
  - supply of finishing hardware for fixed and demountable partitions.

4.3 RELOCATABLE PARTITIONS

4.3.1 Relocatable partitions are non-load bearing partitions which must be able to be demounted and replaced within the time specified and shall be 10 ft. high, or otherwise shown on the drawings.

4.3.2 Types of Surfaces

Unfinished surface: a prime coated surface which shall receive final finish in the field under non-systems work.

4.3.3 Fire and Flame Spread

4.3.3.1 Relocatable partitions shall be available unrated and with a 1-hour rating.

4.3.3.2 All partitions shall be rated non-combustible as defined in B.O.C.A. Basic Building Code of 1970, Paragraph 903.71.

4.3.4 Impact Resistance

4.3.4.1 Impact Load Tests shall be performed in accordance with ASTM E72-61. The test specimen shall be 8' or 10' in height and from 3'-4" to 4'-0" in width. Glazed partitions are excluded from this requirement.

4.3.4.2 For a drop of 3', the set of the upper face of the panel shall not exceed 1/8" and shall not fracture the panel. The instantaneous deflection of the upper face shall not exceed 1/2" for an 8'-0" high panel and 5/8" for a 10'-0" high panel.

4.3.4.3 Tests shall be performed on similar specimens of each panel type.

4.3.4.4 Tests shall be performed on the standard panel to determine impact resistance of the surface in accordance with Military Specification MIL-T-1717A (Ships). In brief, the test material must withstand the impact of an 8 ounce, 1-1/2" o.d. steel ball dropped from a height of 18". The surface shall not show any fracture or break.

4.3.5 Acoustics

4.3.5.1 Partitions shall have the capability of a rating of STC 40 (Sound Transmission Class) using solid panels, excluding doors, when tested in accordance with ASTM E90-66T.

If, in the opinion of the owner, the assembly is not adequate for this criteria, a field test will be required to verify the acoustical

4.3.5 Acoustics (continued)

adequacy and that test shall be run in accordance with ASTM E336-67T by an independent agency approved by the owner. The sample selected will be from a solid wall with a minimum dimension of 9' x 14' and as selected by the owner. The results achieved shall be equivalent to a field STC 35. If the sample fails the test, the cost of the test, and subsequent testing and any corrections to the partition to verify and certify the adequacy shall be borne by this sub-system contractor. If the sample passes this initial test, the cost of the test will be borne by the owner.

Partitions containing one door or one window in 30' of partition shall have a rating of STC 25.

Partitions noted on the drawings as acoustic rated, such as in Music Rooms, shall have the capability of a rating of 45, and by the above mentioned field test, a field STC of 41. Double glazing door seals and gasketing to meet this criteria shall not project beyond face of wall, and shall provide a minimum rating of STC 40 per ASTM E-90.

4.3.5.2 Installation details shall be such that the acoustical properties shall be retained after one relocation of the partition by the owner.

4.3.6 Dimensional Criteria

4.3.6.1 Relocatable partitions are not required to conform to the 60" planning grid.

4.3.6.2 In order to turn corners, accommodate walls of different thicknesses, and accommodate structural elements, demountable partitions shall provide for horizontal planning flexibility. If a single basic panel size is used with smaller standard panel elements to provide this required flexibility, it shall still provide for the incorporation of a standard 36" door. The desired panel widths to be used by the prospective bidders shall be looked at in accordance with the bidding sheets and be submitted to the CSP Director for approval.

4.3.6.3 It shall be possible to cut down partition heights in order to accommodate furred ceiling areas. These areas may be 12" or 24" below the normal ceiling plane.

4.3.6 Dimensional Criteria (continued)

4.3.6.4 Glazed relocatable partitions shall be in heights of 10'. Glass panels shall be either full height or stacked at 3'-6" or 7'-0" above the floor level. Therefore, the portions of solid panels to be used below the glass must be 3'-6" or 7'-0" high (the 7'-0" height is nominal and shall match the door height). Provisions for double glazed shall be included in relocatable partitions.

4.3.6.5 To achieve wall heights which are greater than 10', various combinations of solid panel sizes shall be submitted for approval.

4.3.7 Attachment

4.3.7.1 Relocatable partitions shall not be attached to the floor through a floor finish in a method that visably damages the floor finish.

4.3.7.2 A 4" base molding, as approved by the CSP Director, shall be provided, which is reusable when the relocatable partitions are moved or when services are installed. The base molding for the optional fixed partition is not required to be removable. The base molding shall have a maximum projection of 3/8" and shall adjust to floor variations. The total base configuration shall provide continuous light and sound seal at floor contact.

4.3.7.3 The base details shall be designed so that compensation may be made for variations in floor height. The total maximum variation shall be 5/8" from a bench mark, with the maximum variation of 3/8" in a 10' circle.

4.3.7.4 Relocatable partition attachment at the top shall be to support points located 5' on center parallel to the planning grid or up to 7'-3" on center diagonal to the planning grid. The supports shall be provided as part of the Lighting-Ceiling/Structure sandwich. A number of different head conditions will exist and shall be provided for, including attachments to: structure, ceiling panels and/or supporting rails, subsidiary bracing members, and filler members. The material and surfaces to which attachment may be made shall be provided as part of the Lighting-Ceiling Sub-System. The maximum

4.3.7 Attachment (continued)

variation in height of these attachment surfaces shall be ± 1/4" to 3/8" from dead level. (This does not include the potential deflection of the structure due to live loads which shall also be compensated for by the partition system.) If the variation is greater, it will be the responsibility of the Lighting-Ceiling Contractor to level the ceiling before this Sub-System contractor begins work.

4.3.7.5 If a ceiling molding is used for relocatable partitions it shall be removable. The color shall be chosen to be compatible with the ceiling.

4.3.7.6 The head details shall provide a continuous light and sound seal at ceiling contact. If a Sub-System is developed on the basis of exerting pressure against the ceiling it shall be related to a ceiling system capable of taking the upward pressure.

4.3.8 Joints, Corners and Terminations

4.3.8.1 Vertical joints of relocatable partitions shall be minimized by maintaining a flush surface across any joint with no protrusions or indentations and with only one or two flush vertical lines, the intent being to de-emphasize any post and panel appearance and make the partition surface usable in its entirety. A single coherent detailing approach shall be used, for all joint conditions, and shall be submitted for approval to the CSP Director.

4.3.8.2 It shall be possible to obtain all the standard rectilinear intersections for both fixed and demountable partitions.

1. straight line joint
2. two-panel corner joint
3. three-panel corner joint
4. four-panel corner joint
5. finished end where the panel wall is not continuous
6. starting end where the interior partition meets with other components (e.g., Structure or Vertical Skin in a vertical joint)
7. a discontinuous joint where one partition meets another in the middle of a panel.

4.3.8 Joints, Corners and Terminations (continued)

4.3.8.3 The method of illustrating the various types of joints above indicates the conditions which may be met. They do not necessarily indicate methods to be used. See Item 4.4.

4.3.8.4 Joint details shall be developed to be acoustically tight.

4.3.8.5 The partition corner details shall provide sufficient strength so that the partition is secure and complies with code requirements, when none of the partitions meeting at the corner fall directly beneath a supporting structural member.

4.3.8.6 At the corners a channel or cover strip will be permitted up to a width of 2" and a thickness of 1/8" if the details are consistent and are visually acceptable to the CSP Director. The finish of this cover strip or channel shall be consistent with that of the partition panels.

4.3.8.7 The end of a run of partitions shall occur when the partitions intersect other components or terminate in open space. The partition shall be secure when unsupported at the end other than by the ceiling and floor. When the partitions intersect another surface, that surface shall be true and smooth. The end jointing detail shall have ability to cope with variations of up to 3/8" and provide a continuous light and sound seal.

4.3.8.8 External corners of all partitions shall minimize the possibility of bodily injuries. Bull-nose units shall be used in any optional fixed partition masonry walls.

4.3.8.9 Walls for physical education areas in optional fixed partitions shall be constructed to eliminate projections, such as columns.

4.3.9 Modified Partitions

4.3.9.1 Diagonal bracing members, if used, shall be closed in and covered by this Contractor in a manner similar to plumbing lines.

4.3.9.2 Fixed partitions capable of taking lateral loads will be designed by the individual Architects and their Engineers.

4.3.10 Doors

4.3.10.1 Door panels for relocatable partitions shall be provided for single and double doors. The actual width of the door openings shall not be less than 3'-0" and the height shall be 7'-0". The double door shall be made of two single doors 3'-0" wide.

4.3.10.2 The door panels shall be detailed so that two single door panels can be put next to each other in an in-line condition as shown as joint number 1 in Item 4.4. The joint system shall also be detailed so that any of the panels meeting in a corner condition in joints 2, 3, or 4 in Item 4.4 could be a door panel.

4.3.10.3 Solid core hardwood faced with plastic laminate and/or 18 ga. hollow metal doors having a thickness of 1-3/4" will be accepted which meet the following standards with their tests:

- Solid core bonded hardwood doors Commercial Standards Association CSA D132-'61.
- Hollow Metal Doors and Frames - Product Standard PS 4-66 of the U.S. Department of Commerce, "Standard Stock Light Duty 1-3/8" and 1-3/4" thick Flush Type Interior Steel Doors and Frames."

4.3.10.4 In addition to the requirements for slab doors, a maximum of three combinations of slab and glazed doors, and doors with louvers shall be provided in single doors and double doors. Louvers shall not be greater than the maximum size permitted by code.

4.3.10.5 The design of the doors shall be approved by the CSP Director. The three door types shall meet the following requirements:

Single and Double Doors:

- Slab door
- Glazed door - 50% glass, 25% glass, 12-1/2% glass and 6% glass
- Door with louver - louver may vary from 15% to 25% in area

Optional full height doors with no transom shall be available.

4.3.10.6 All doors and frames shall be reinforced, drilled and tapped to receive hardware as specified.

4.3.10.7 Doors suitable for installation in partition as described in 4.3.5 shall have the capability of a rating of STC20 for a solid flush door when tested in accordance with ASTM E-90-66T.

4.3.10 Doors (continued)

4.3.10.8 Doors shall have prime coat applied by this bidder ready for finish paint in the field under non-system work. If the bidder wishes to include for finish paint, he shall do so on an alternate basis.

4.3.11 Finishing Hardware

4.3.11.1 This Sub-System shall include the installation of finishing hardware and the hanging of doors for relocatable partitions.

4.3.11.2 Finishing hardware shall be furnished by others and conform to the most recent issue plus all amendments of the following standards:

- Master Specification Finish Hardware, Board of Education, City of Detroit, for Locks, Door Closures, Door Holders and Silencers, and Hinges.
- Exit Hardware: Conforming to requirements of Bulletin F-412 of the Fire Marshal Division, Michigan State Police.

4.3.11.3 Applied items such as push plates, door pulls, and kickplates shall also be installed. Bidders shall suggest a schedule for unit prices for installation of hardware with the Bid for approval by the CSP Director.

4.3.12 Grilles

4.3.12.1 Grilles may be installed by other trades in a small number of partition panels. Holes for grilles shall be cut at the expense of the Sub-System Contractor requesting the cut-outs.

4.3.13 Glass and Glazing

4.3.13.1 This Contractor shall include all glass and glazing for the demountable partitions. Glazing details shall be approved by the CSP Director. Unit prices shall be given for the different types of glass. Glass type and thickness shall be selected in accordance with applicable rules and regulations.

4.3.13 Glass and Glazing (continued)

4.3.13.2 In a one-hour enclosure, 1/4" fixed welded wire glass shall be provided. The largest piece of wire glass shall be 1,296 square inches for a one-hour enclosure. Larger glass panels may be used in non-rated partitions.

4.3.13.3 Glass types shall be presented to the CSP Director for approval.

4.3.14 Replacement or Relocation

4.3.14.1 It shall be possible for two school custodians to install and/or replace individual partition panels with no visable difference in appearance. A single panel in the middle of the run shall be replaced in two hours by two custodians, and a 28'-0" wall moved from one location to another in 16 hours by four custodians. It is anticipated that major changes would be made in the plan of the project schools during vacation periods and that these would probably involve outside personnel.

4.3.14.2 The weight of any individual portion of the Sub-System to be moved as a single piece shall not exceed 200 pounds.

4.3.14.3 The Bidder shall state the cost per lineal foot of material to be replaced.

4.3.14.4 A manual of instructions describing the process of relocating panels shall be provided to the custodial staff of each school.

4.3.14.5 Additional panels or panel facings shall be available on an individual basis for at least two years after completion of each school. A proposal suggesting the pricing structure for these panels shall be submitted to the CSP Director with the Bid. These prices shall comply with provisions of the General Conditions, and shall reflect the size of the individual orders for extra panels.

4.3.15 Attachment of Accessory Objects

4.3.15.1 It shall be possible to attach objects to the partitions directly or by means of brackets. These objects will be designed to fit the

4.3.15 Attachment of Accessory Objects (continued)

panel module and will consist of such varied items as bookshelves, storage units, map rails, screens, caseworks assemblies, special lighting, accessory writing and tackboard surfaces. All accessory items will be provided under a separate contract.

4.3.15.2 The weight of the objects to be hung will not exceed 100 lbs. per lineal foot on either side of the panel where the maximum moment is 100 ft. lbs. per lineal foot. The panels shall be designed so that they are stable when full load is imposed on one side and none on the other. This eccentric load will have to be supported at the top by the ceiling system. See Sub-System No. 3, Lighting-Ceiling.

4.3.15.3 Supporting systems of channels or rails shall be permitted as part of the attachment system. The design of the attachment system shall be submitted to the CSP Director for approval with the bid.

4.3.16 Passage of Services

4.3.16.1 Provision for both vertical and horizontal passage of 7/8" electrical conduit or lay-in wiring in a wiring raceway shall be made in both the partitions. Vertical passage shall be provided in each panel and/or panel joint including passage around a door in the door panel. Base outlets shall be located within the base molding. Accommodation for horizontal passage of wiring shall be required only for the initial installation in non-system or optional system masonry-type partitions.

4.3.16.2 Provision shall be made so that the openings for outlet boxes shall be provided readily. Lines of 250V or less shall be accommodated in relocatable partitions. Higher voltage lines shall be run through fixed partitions only. Details shall be submitted for approval by the CSP Director. Accommodation for the above requirements will be required only for the initial installation in walls.

4.3.16 Passage of Services (continued)

4.3.16.3 The system of relocatable partitions shall have hollow service panels to house the following services: thermostat, switches, communication system, TV jack, clock, telephone, etc. Design and location of cutouts for these services shall be identical for the 10' high partitions. Design of the service panel shall be worked out with the CSP Director and it shall be coordinated with the work of Sub-System contractors affected. This Contractor shall not be required to install services but only supply the panels.

4.3.16.4 The partition system shall be designed so that switches may be accommodated on the job in locations other than the service panel if necessary.

4.3.16.5 It shall be possible, without impairing the fire rating, to recess large items, such as drinking fountains, fire extinguisher cabinets, panel boards, etc., in a fixed wall of sufficient thickness, on the job, although the work would be done by other trades. Provisions shall be made to enclose all plumbing lines and vents within the fixed partitions. See Item 4.3.6.2.

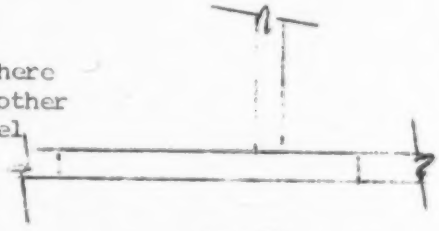
4.3.16.6 The installation of the plumbing lines shall be done by that trade and is not included in this Sub-System contract. Within the plumbing walls, horizontal pipe runs of up to 30' must be accommodated.

4.4 JOINTS

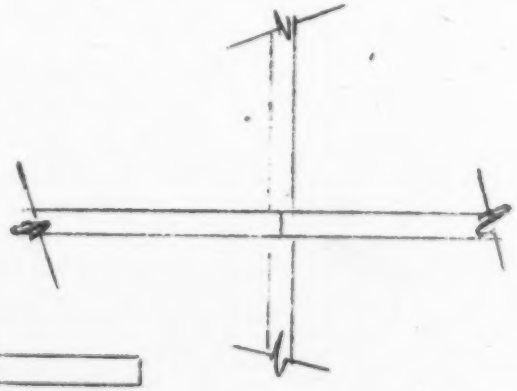
1. Straight line joint

2. two-panel corner joint

3. discontinuous joint, where one partition meets another in the middle of a panel



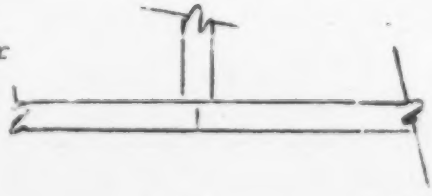
4. four-panel corner joint



5. finished end

6. starting end, where partition meets with other component

7. three-panel corner joint



Firm Name: _____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 4

SUB-SYSTEM NO. 4 - INTERIOR SPACE DIVISION

(Submit in Duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 4 Work - Interior Space Division

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility, and transportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. This sub-contract shall be based upon the price terms and conditions set forth in the Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____ Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

P.3 (cont)

INTERFACING BIDDER BY CHOICE	PRICE ADJUSTMENT
Re Sub-System No. 1 - Structure	
1st	Base Bid
2nd	
3rd	
Re Sub-System No. 2 - Atmosphere	
1st	Base Bid
2nd	
3rd	
Re Sub-System No. 3- Lighting-Ceiling	
1st	Base Bid
2nd	
3rd	
Re Sub-System No. 5 - Vertical Skin	
1st	Base Bid
2nd	
3rd	

P.4 All work covered by the following Addenda is included with this Proposal. The Base Bid shall include:

Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____

P.5 In compliance with the instructions in the Notice to Bidders the undersigned states that the completion of this project will be in accordance with the Master CPM Progress Schedule prepared by the Owner.

P.6 The following separate prices are included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($)

2) Cerveny School Addition

The sum of _____ Dollars ($)

3) Sherrard School Addition

The sum of _____ Dollars ($)

4) Delbert E. Roberts Addition to Cooley High School

The sum of _____ Dollars ($)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead, and profit, and shall be applied to the net differences in quantities. The following unit prices are to be used as a basis for negotiating additions and/or deductions in the Contract.

P.7.1 Number and Description of Unit Prices:

1) Relocatable Partition (non-rated)	10'-0" high		12'-0" high	
	ADD	DEDUCT	ADD	DEDUCT
1. Solid Panel (unfinished)	$	$	$	$
2. Wire Glass above 7'-0"				
3. Wire Glass above 3'-0"				
4. Fully glazed - Wire Glass				

P.7.1 Number and Description of Unit Prices: (continued)

2) Relocatable Partition (Rated 1-hour) per lin. ft.	10'-0" high		12'-0" high	
	ADD	DEDUCT	ADD	DEDUCT
1. Solid Panel (unfinished)	$	$	$	$
2. Clear Glass above 3'-6"				

3) Acoustic Rated per lin. ft.	10'-0" high		12'-0" high	
	ADD	DEDUCT	ADD	DEDUCT
1. Solid Panel (unfinished)	$	$	$	$
2. Clear Double Glazed above 3'-6"				

4) Doors Including Frame per unit	ADD	DEDUCT
3'-0" x 7'-0" Solid	$	$
3'-0" x 7'-0" Acoustic Rated		
2 @ (3'-0" x 7'-0" Solid		

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Bond as stipulated. The premiums on the Performance Bond and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.10 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions, and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1. _____

2. _____

3. _____

c. ( ) Corporation, incorporated under the State Laws of

_____.

P.12 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date _____

Firm Name _____

By _____

In the Presence of _____

Title _____

_____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the Proposal shall be declared irregular.)

SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 5 - VERTICAL SKIN

C O N T E N T S

ITEM		PAGE NO.
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SPECIFICATIONS FOR THE FIRST CSP BUILDING SYSTEM

SUB-SYSTEM NO. 5 - VERTICAL SKIN

5.1 CONTRACT DOCUMENTS

Parts I, II and III are part of this specification.

5.2 SCOPE

5.2.1 General

Elevational drawings accompany these performance specifications to provide the bidder with the percentage of window area required and the massing on the building design. These drawings do not indicate a design solution, though panel size and arrangement are suggested. No effort has been made to presuppose any particular sub-system submission.

5.2.2 Work Included

Panels
Doors (7' high, to occur singly or in pairs) in vertical skin
Overhead doors in vertical skin
Windows - fixed glazing and sidelights in vertical skin
Glass and glazing in vertical skin
Grilles, louvers, and access panels in vertical skin
Frames - door, window, etc. in vertical skin
Protective bumpers, plates and guard rails in vertical skin
Exterior and interior finishes in vertical skin
Weatherstripping of panel junction points
Connection to adjacent Sub-Systems
Openings in vertical skin
Installation only of finishing hardware
Spandrel facing for Structural Sub-System canopies
Column covers for free-standing exterior Sub-System columns

5.2 SCOPE (continued)

5.2.3 Work Excluded from this Sub-System

Roofing and flashing at the juncture of Vertical Skin and roof
All atmosphere elements
All electrical elements
All plumbing elements
All accessory elements which attach to the Vertical Skin, such as exterior handrails, casework, etc.
Supply of finishing hardware
Exterior soffits
Structural enclosures including doors and windows
Overhead doors in non-system walls

5.3 COMPONENTS

5.3.1 Exterior Face and Finish

5.3.1.1 Materials which can be readily identified in traditional terms might be listed as:

- high temperature, burnt ceramic origin
- concrete origin
- metal curtain wall class

The Sub-System Contractor shall offer at least one of the above material choices as an alternate submission.

5.3.1.2 Within each category established by a material alternate, there are two probable sub-divisions:

- Texture
- Color

Alternate textures are:

- Very rough
- Medium texture
- Smooth
- Polished

5.3.1 Exterior Face and Finish (continued)

5.3.1.3 Integral color additives or applied coatings used in the exterior finish of the products offered as vertical skin shall be guaranteed for a period of 20 years against any color change. The adhesion of applied coatings shall also be guaranteed for a period of 20 years, except for reasonable weathering or wear.

5.3.1.4 State provision for resistance of appearance and material to qualitative deterioration due to soluble or insoluble salts, alkali attack, corrosion, oxidization, and chemical attack, no matter of what origin except malicious attack.

5.3.1.5 All materials shall show demonstrable resistance to rodents, vermin, mildew, fungus and algae.

5.3.2 Interior Face and Finish

5.3.2.1 Interior face and finish shall be physically and visually compatible with the finished face of the Interior Space Division Sub-System, and shall be capable of meeting all criteria established for that Sub-System.

5.3.2.2 In addition, the interior face shall include provisions for enclosing building services as required by other Sub-Systems.

5.3.2.3 Field painting of interior surfaces is hereby deleted from this work. It shall be non-system. Bidder shall indicate type of finish and methods that can be used for field finishing.

5.3.3 Doors and Windows

5.3.3.1 Doors shall be 7'-0" high and shall have a U factor of 0.56 or less. Where a requirement exists for a pair of doors, removable mullions shall be provided.

5.3.3.2 Doors shall have a Sound Transmission Class (STC) 20 when tested in accordance with ASTM E90-66T.

5.3.3 Doors and Windows (continued)

5.3.3.3 Windows shall accept the following dimensional limitations:

- minimum head height 7'-0"
- maximum sill height 4'-0"
- Alternate sill heights 2'-0" and 3'-0"

5.3.3.4 Mixed combinations containing any two or all of the following shall be possible: doors, windows, and louvers.

5.3.3.5 Overhead type door shall be available. Head height need not exceed 7'-0" and shall be available to fit planning grid. Overhead door and frame need not be thermally broken.

5.3.4 Frames

5.3.4.1 Door and window frames shall have a thermal break. The interior surfaces of the frames shall not be lower under winter conditions than the limiting surface temperature for condensation provided by glazing on a door. There shall be no infiltration between the frame and the interior face material of the Vertical Skin.

5.3.4.2 Frames shall be weatherstripped to prevent infiltration in excess of 0.5 cubic feet/minute/lineal foot. Door frames shall be designed to ensure the exclusion of water.

Window frames shall accommodate a hopper venting sash.

5.3.4.3 All door frames shall make provision for incorporating header panels to close from door head to ceiling.

5.3.5 Finishing Hardware

This Bidder shall include the preparation for installation of all finishing hardware including reinforcement as required. Templates will be provided. Hardware, supplied by others, shall be installed by this contractor and will conform to the most recent amendments of the following standards from the Master Specification Finish Hardware, Board of Education, City of Detroit, Michigan, and include the following:

5.3.5 Finishing Hardware (continued)

- Locks, Door Closures
- Door Closures
- Door Holders and Silencers
- Thresholds, and
- Hinges
- Exit hardware - conforming to the requirements of the Fire Marshal Division, Michigan State Police, Bulletin 412.

5.3.6 Glazing

5.3.6.1 Glass:

5.3.6.1.1 Sheet glass - "B" quality, flat drawn.

5.3.6.1.2 Plate and float glass: glazing quality, polished plate 1/4" thick.

5.3.6.1.3 Safety glass - 1/4" thick tempered or 5/16" thick laminated.

5.3.6.1.4 Wired glass - conforming to paragraph 3.4.1.1 of USA Federal Specification DD-G-451a, clear 1/4" thick as approved by the Underwriters' Laboratories or Fire Marshal.

5.3.6.2 Units shall be 56% of visible light, minimum.

5.3.6.3 Glazing shall have a U factor of 0.58 or less. Units shall be hermetically sealed.

5.3.6.4 Material used to contain the glazing shall have the capability of remaining flexible and of retaining its shape and resiliency for a period of not less than five years, in accordance with applicable ASTM specification.

5.3.6.5 Impact Resistant Glazing - Plastic glazing lights shall conform with Fire Marshal State School Bulletin 412.

5.3.6.6 Bids shall be based on the use of sheet glass in windows and plate glass in doors and screens as specified and conforming to the applicable requirements of Federal Specifications DD-G-00451b "Flat Glass for Glazing Purposes," with optional additional prices to incorporate other types of glass.

5.3.6 Glazing (continued)

5.3.6.7 An alternate price shall be available for uninsulated exterior doors and frames for use where a fully enclosed vestibule is planned. Submit an alternate price to use glazing material that has the following characteristics:

5.3.6.7.1 Will meet or exceed an impact test as outlined in 5.4.3.1.2 or be equal to 1/4" tempered glass.

5.3.6.7.2 Will not change color measurably during the guarantee period.

5.3.7 Fire Access Panels

5.3.7.1 As required by the Fire Marshal, a panel shall be provided through which access to the interior of the building may be gained for fire-fighting purposes. This panel shall meet all the previously stated requirements.

5.3.7.2 It is not contemplated that there will be a large number of these units. Details of the units and its operation shall be submitted to the CSP Director at the time of receipt of bid.

5.3.8 Furring

5.3.8.1 This Sub-System shall provide a method of furring the vertical skin for interior areas where athletic activity is planned. This shall give a flush wall at points where a body could come in contact with the wall. This furring shall be capable of resisting the type of activity that might be anticipated in such a location, including but not limited to bodily impact and the bouncing of basket, volley or tennis balls.

5.3.9 Decorative Louvers

5.3.9.1 This Sub-System shall offer a range of louvers with a method of connecting them to Sub-System No. 2, Atmosphere, for supply and exhaust of air. These shall be designed to exclude rain, birds, and vermin. These shall be quoted on a unit price basis. Operable or control louvers are considered part of Sub-System No. 2.

5.3.10 Expansion & Control Joints

5.3.10.1 Make provision for and detail expansion and control joints as required by this Sub-System and by Sub-System No. 1 - Structure. These shall be designed to exclude the weather.

5.3.10.2 Where required provide expansion and control joint covers for both interior and exterior faces.

5.4 VERTICAL SKIN PROPERTIES

5.4.1 Acoustics

5.4.1.1 The vertical skin shall have an exterior to interior sound attenuation, through solid or glazed panel but excluding doors of not less than STC 27 as tested in the field. Testing shall be done in accordance with ASTM E90-66T.

5.4.2 Fire and Flame Spread

5.4.2.1 Vertical skin shall be available non-rated, and also with a one-hour rating, and a non-combustible rating.

5.4.2.2 It shall be possible to obtain a two-hour fire rating for a fire wall, using Vertical Skin Sub-System with additional elements as required.

5.4.2.3 Vertical skin materials shall be non-combustible.

5.4.3 Impact Resistance of Surfaces

5.4.3.1 Exterior Surfaces:

5.4.3.1.1 Impact load tests shall be performed in accordance with ASTM E72-61. The test specimens may be from 10 feet to 14 feet in height, and from 30 to 60 inches in width. Tests shall be performed on not less than four duplicate specimens.

5.4.3.1.2 The test material must withstand the impact of an 8 ounce 1-1/2" o.d. steel ball dropped from a height of 18". The surface shall not show any fracture or break. The point of impact shall be not less than the thickness of the material from the edge of the panel.

5.4.3 Impact Resistance of Surfaces (continued)

5.4.3.2 Interior Surfaces:

The interior surface of the panel shall meet tests as specified for the Interior Space Division Sub-System, Item 4.3.4.

5.4.4 Abrasion Resistance

Abrasion resistance testing shall be established by the CSP Director in accordance with the materials which are proposed by this Sub-System Contractor to the CSP Director at the Bid.

5.4.5 Vapor Penetration

The Vertical Skin Sub-System shall present a barrier to the passage of moisture vapor. The barrier shall be located in such a position as to allow the passage of interior services within the controlled environment.

5.4.6 Moisture Absorption

The criteria for moisture absorption will be established by CSP Director according to the class and kind of material proposed by the Sub-System Contractor at the receipt of Bids.

5.4.7 Thermal Insulation

The U factor for the Vertical Skin shall not be greater than 0.15 for members other than glazing or doors. Insulation must not be capable of settlement or compaction due to site and other vibration.

5.4.8 Strength

The Vertical Skin shall be self-supporting in floor to floor heights. The Sub-System with all of its components collectively and individually shall be designed to withstand a positive or negative pressure due to wind of 15 pounds per square foot. Contractor shall make provision for loads applied by attaching non-system items. Designate methods of attachment and loading capability.

5.4.9 Weatherproofing

This Sub-System shall be designed in conjunction with other Sub-Systems to completely exclude water in any form.

5.4.10 Air Infiltration

Air infiltration or exfiltration through any square foot of Vertical Skin shall not exceed 0.05 cubic feet per hour when the pressure differential interior to exterior is 0.2 inches water gauge.

5.4.11 Accelerated Weathering

Tests shall be prescribed by CSP according to the Class and kind of material submitted to CSP by this Contractor at the Receipt of Bids.

5.4.12 Humidity Resistance

Materials shall be exposed to 400 hours in an atmosphere with 100% humidity and a temperature of 100°F, with no appreciable deterioration.

5.4.13 Washability

5.4.13.1 Exterior surface tests will be established by the CSP Director for the class and kind of material as proposed by this Contractor at the Receipt of Bids.

5.4.13.2 The paint or other surface finish must be tested in accordance with Federal Test Method Standards 141, Methods 6141, 6142 and 6143, or Federal Specifications P.C.431a, Cleaning Compounds, Synthetic Detergent, Non-abrasive, All Purpose, and P.D. 220a, Detergent, General Purpose on a Gardner Washability Machine Model 105A.

5.4.14 Repair of Surface

Marks due to cutting or scratching shall be easily repairable in the field by the Board's staff so that they are not normally noticeable.

5.4.15 Colors and Textures

5.4.15.1 Colors and textures of finished surfaces shall be approved by the CSP Director. Colors shall be selected in accordance with ASTM-D-1535 latest revision. (Standard Method of Specifying Color by the Munsell Method.)

5.4.15.2 The gloss range for the colors shall be 30, plus or minus 5 degrees, as measured on a Gardner 60° Glossmeter. (ASTM D-523 latest revision.)

5.4.15.3 The Contractor shall submit with the Bid a proposal indicating the variety of textures and/or colors proposed for approval by the CSP Director.

5.4.15.4 The Bidder shall submit as his base bid the most economical acceptable exterior finish he presented to the CSP Director. In addition, he shall include at least two options which will be available together with a unit cost increment. Only one option shall be used on any one building.

5.5 DESIGN CRITERIA

5.5.1 The Sub-System shall be designed so that the windows and side lights are visually compatible with doors and other openings.

5.5.2 Interior face of the Vertical Skin shall be compatible with the Interior Space Division Sub-System, and this would include dimensional as well as visual coordination.

5.5.3 Detail all connections; all types of joints including expansion and control joints; connections to foundations; self drainage if any; and method of accommodating deflection of supporting member of Sub-System No. 1, lateral drift of the building and other Sub-System construction tolerances. Submit at Bid time any limitations this contractor wishes to impose on the use of the Sub-System. The detailing shall also establish ways of connecting or butting traditional materials to the Vertical Skin, and vice-versa. Consistency and simplicity of detailing is of the essence.

5.5 DESIGN CRITERIA (continued)

5.5.4 Glazed area in the building design shall be limited by solar heat gain as follows:
Heat gain: - External heat gain in any atmosphere module shall not exceed a maximum of 17 btu/hour/square foot of exposed wall in any orientation. Design proposals shall be submitted with the Bid.

5.5.5 Vertical skin shall be capable of being removed independently, floor by floor. Solution which uses the vertical skin of the floor below as a means of support shall not be considered.

5.6 ATTACHMENT OF VERTICAL SKIN

5.6.1 The Vertical Skin shall have a method of attachment to the structure which shall take into account drainage, site, or construction irregularities. There shall be no possibility of site and air vibrations or normal temperature movements of building loosening, weakening and/or fracturing the connection between units and the structure or between the units themselves.

5.6.2 Provide, for approval of the CSP Director, all engineering calculations, indicating that the method of attachment complies with, and is capable of meeting or exceeding, the applicable building codes. Methods of attachment shall be coordinated with the Structure Sub-System.

5.5.3 This Sub-System shall be capable of accommodating structural diagonal bracing and/or seismic bracing, or may itself be capable of performing this function.

5.6.4 Provide at least one set of details of junction with a non-system exterior soffit including Bidder's option for sequence of erection of the soffit - vertical skin interface.

5.7 PASSAGE OF SERVICES

5.7.1 Electrical

5.7.1.1 Provision for both vertical and horizontal passage of a 7/8" electrical conduit or lay-in wiring in a wiring raceway. This provision shall be made in each planning grid. Horizontal passages shall be provided at the base or top of panels. Provision shall be made so that openings for outlet boxes shall be easily accessible. Provide a finish to the raceway at the bottom of the exterior wall flush with the inner surface of the wall. This surface shall be suitable for the fixing of the finished wall base.

Voltages from 12V to 110V shall be accommodated in both directions. Details must be approved by the Public Lighting Commission.

5.7.1.2 The Vertical Skin shall have panels to accommodate the following services singly or in combination:

	Inside	Outside
Thermostat	x	
Switches	x	
Communications Systems	x	
Outlets	x	
Clock Outlets	x	
Bell Telephone Outlets	x	
Alarm and Signal Devices	x	
Siamese connections		x
Lawn valves and other water valves		x
Drinking fountains	x	x
Weatherproof power outlets		x
Hanging caseworks	x	
Gymnasium equipment	x	
Venetian blinds and drape tracks	x	

End fixings for railings and handrails and other miscellaneous metal items both inside and outside.

5.7.1.3 Design and location of outlets for these services shall be identical in all panels, and shall be submitted for approval by the CSP Director.

5.7.2 Plumbing

Provisions shall be made to enclose plumbing lines and vents within the Vertical Skin.

5.7.3 Atmosphere

Provision shall be made to accommodate individual runs of ducting for the atmosphere Sub-System Contractor as required by his proposed system, including supply or return grilles as required.

5.7.4 Accessories

The Sub-System Contractor will not be required to install services, either electrical or mechanical, but only to supply a unit capable of accommodating the above. He shall include such access panels as may be reasonably required as well as service panels, grilles, or enclosures. All designs shall be submitted to CSP for approval at Bid time. This contractor shall be responsible for drilling or forming all holes in Vertical Skin panels to accommodate lights, speakers, or other devices fixed to the exterior of the building.

5.8 TOLERANCES

This system shall have sufficient tolerance to lose or gain a dimension equal to the panel tolerance plus 1/8" to compensate for inaccuracies in the construction of the building.

Firm Name_____

Detroit Board of Education
School Housing Division
Construction Systems Program

PROPOSAL NO. 5

SUB-SYSTEM NO. 5 - VERTICAL SKIN

(Submit in Duplicate)

To: The Board of Education
of the City of Detroit

Business Manager's Office
5057 Woodward Avenue
Detroit, Michigan 48202

Proposal for: Sub-System No. 5 Work - Vertical Skin

P.1 The undersigned, having familiarized themselves with the local conditions affecting the cost of the work and with the Contract Documents, including Advertisement for Bids, Notice to Bidders, General Conditions, Supplementary General Conditions, Drawings, Specifications, and any and all Addenda issued, hereby proposes to perform everything required to be performed and to provide and furnish all the labor, materials, tools, expendable equipment, utility, and tranportation services, etc., necessary to perform and complete in a workmanlike manner all of the Sub-Systems Work required under Base Bid for the aforementioned project, all in strict accordance with the Contract Documents and the schedule of price adjustments below prepared by the CSP Director.

P.2 The undersigned further agrees to work with the General Contractor designated by the Owner. This sub-contract shall be based upon the price terms and conditions set ~~forth in the~~ Proposal. The undersigned further agrees to furnish the Owner with a Performance Bond and a Labor and Materials Payment Bond in the amount of his bid and the cost of such bonds is included in the Base Bid.

P.3 In consideration for all of the above requirements, the undersigned agrees to accept in payment the lump sum of _____ Base Bid. Said sum to be subject to all of the terms of the contract and to include all money allowances called for in the Specifications applicable thereto.

P.3 (cont)

INTERFACING BIDDER BY CHOICE	PRICE ADJUSTMENT

Re Sub-System No. 1 - Structure

1st _____	Base Bid _____
2nd _____	_____
3rd _____	_____

Re Sub-System No. 3 - Lighting-Ceiling

1st _____	Base Bid _____
2nd _____	_____
3rd _____	_____

Re Sub-System No. 4 - Interior Space Division

1st _____	Base Bid _____
2nd _____	_____
3rd _____	_____

P.4 All work covered by the following Addenda is included with this Proposal. The Base Bid shall include:

Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____
Addendum No._____, dated _____

P.5 In compliance with instructions in the Notice to Bidders, the undersigned states that the completion of this project will be in accordance with the Master CPM Progress Schedule prepared by the Owner.

P.6 The following separate prices are included in the Base Bid, but are brought forth for information and/or accounting purposes:

Cost Breakdown per School

1) Boynton School Addition

The sum of _____ Dollars ($)

2) Cerveny School Addition

The sum of _____ Dollars ($)

3) Sherrard School Addition

The sum of _____ Dollars ($)

4) Delbert E. Roberts Addition to Cooley High School

The sum of _____ Dollars ($)

P.7 Unit Prices

The undersigned submits the following unit prices which shall govern for authorized additions and/or deductions in the work, and shall include all charges for supervision, overhead, and profit, and shall be applied to the net differences in quantities. The following unit prices are to be used as a basis for negotiating additions and/or deductions in the Contract.

P.7.1 Number and Description of Unit Prices:

		ADD	DEDUCT
1)	Opaque Wall per square foot vertical surface area	$_____	$_____
2)	Door and Frame per unit	$_____	$_____
3)	Per glazed opening		
	a. Operable Unit 10 to 20 s.f.	$_____	$_____
	b. Fixed Unit 10 to 20 s.f.	$_____	$_____
	c. Fixed Unit 20 to 40 s.f.	$_____	$_____

P.8 The undersigned affirms that he has familiarized himself with the drawings and specifications of all various classifications of work on which proposals will be received, as set forth in the Advertisement for Bids, and agrees that the cost of all work, which is specifically called for or may be reasonably inferred to be done as part of the Building Work, has been included in the price herein set forth.

P.9 Accompanying this Proposal is a certified check or a bid bond, payable to the Board of Education of the City of Detroit, which sum it is agreed shall be forfeited to the Owner if the undersigned fails to enter into a contract in accordance with the terms of the Contract Documents and to give the required Performance Bond and Labor and Materials Payment Bond as stipulated. The premiums on the Performance Bond and the Labor and Materials Payment Bond are to be included in Proposal Sum.

P.10 The undersigned affirms that he has read and understands the provisions of Article 29 on Non-Discrimination of the Supplementary General Conditions, and agrees to abide by the conditions set forth.

P.11 The undersigned hereby declares that he has the legal status checked below:

a. ( ) Individual

b. ( ) Partnership, having the following partners:

1._____

2._____

3._____

P.11 (cont) c. ( ) Corporation, incorporated under the State Laws of _____.

P.12 The undersigned does hereby declare and stipulate that this Proposal is made in pursuance of and subject to all the terms and conditions of the instructions of this bid and that it is made in good faith, without collusion or connection with any other person or persons bidding for the same work.

Date _____

Firm Name _____

By _____

In the Presence of _____

Title _____

_____

Official Address

_____

_____

(Bidders shall give prices for all alternates and all other items for which prices are requested, and shall not add any conditions or qualifying statement to this Proposal; otherwise the Proposal shall be declared irregular.)

December 21, 1970

Detroit Public Schools
CONSTRUCTION SYSTEMS PROGRAM
51 West Hancock Avenue
Detroit, Michigan 48201

ADDENDUM NO. 1 - C.S.P. SCHEDULING REQUIREMENTS

As outlined in the "Notice to Bidders" (Item 8. Scheduling Program), the Construction Systems Program is to be governed by scheduling requirements. Addendum No. 1 is hereby made a part of the contract documents for the First CSP Building System.

A1.1 Introduction: It is of prime importance to the Owner that the Projects be carried on, and completed in accordance with an overall Critical Path Scheduling System, defining work installation and material delivery dates for all and each of the interrelating contracting parties, including the preparation of documents, and the administration of the contract(s). For this purpose, the Owner has engaged the services of a scheduling consultant to prepare, and monitor the documents relative to the scheduling program. No charges will be laid to the contractor(s) for this service, except as under the conditions described in Paragraph A1.10.1.1 of this Addendum to the Specifications.

A1.2 Major Elements of Schedule:

.1 Master Project Schedule.
.2 Sub-Systems Scheduling Guidelines.
.3 Individual Project Construction Schedule(s) - Pre-Contract Award.
.4 Individual Project Construction Schedule(s) - Post-Contract Award.

A1.3 Master Project Schedule: The Scheduling Consultant shall prepare an overall schedule which broadly defines the completion requirements for the various stages of the project development from planning through to final construction and building occupancy. This schedule will be prepared acknowledging conditions surrounding the project as they are now known to exist, and is subject to revisions, as defined in Paragraph A1.10 of this Addendum to the Specifications.

A1.4 Sub-Systems Scheduling Guidelines:

.1 Under the guidelines of the Master Project Schedule, the Specifications, and the Scheduling Documents, the calendar periods are defined, by individual school project, during which the Sub-System Contractor(s) agree to deliver the material and install the work under the responsibilities of the contract provisions. These periods will be given on an "EARLY START" to "LATE FINISH" basis. The specific calendar dated requirements for each project will be determined by the Individual Project Construction Schedule(s) - Post-Contract Award, which will fall within the limits prescribed by the Sub-System Scheduling Guidelines. (See pages A1-11 through A1-13 of this Addendum.)

.2 The individual Sub-Systems bidders agree, in submitting their proposals, to deliver the material and produce the work within the limits of the requirements of the Sub-System Scheduling Guidelines and, subsequently, of the Individual Project Construction Schedule - Post-Contract Award at no extra charge to the Owner, having included all requisite overtime work and other expenses related to completing the work as required by the scheduling documents.

A1.5 Individual Project Construction Schedule(s) - Pre-Contract Award:

.1 As part of the bidding documents for the General Contract work, this schedule is issued to define Milestone and Project Completion Requirements for each of the individual building projects. These completion requirements shall form one of the bases for the final construction contracts and shall be binding on all parties.

.2 Input to the Individual Project Construction Schedule(s) defining Sub-Systems shall be as indicated in the Sub-System Scheduling Guidelines and shall form the basis for the assumed performance of each of the Sub-System Bidders.

.3 In the space provided on the Proposal Form, the General Contract Bidders shall indicate their approval of the completion requirements stated in the Individual Project Construction Schedule(s) and shall be bound, subject to the conditions of the specifications and the Individual Project Construction Schedule - Post-Contract Award, to complete the work in accordance therewith. No additional charges to the Owner above and beyond the Proposal price shall be allowed as a result of scheduling requirements.

.4 The Individual Project Construction Schedule(s) - Pre-Contract Award shall remain in force until such time as the Individual Project Schedule - Post-Contract Award is completed and approved by all parties to the Contract and shall form the basis for all claims and conditions of scheduling under the contract.

A1.6 Individual Project Construction Schedule(s) - Post-Contract Award:

.1 Within thirty calendar days of the Notice of Contract Award to the General Contractor and based upon the conditions and completion requirements of the Pre-Contract Award Schedule, the General Contractor, his Sub-Contractors, the Sub-Systems Contractors, and the Scheduling Consultant shall prepare the final construction schedule, for each project upon which all provisions of the Contract will be finally based.

.2 Such schedule will be completed in the same format as the Pre-Contract Award Schedule. Within five (5) days of receipt of the final Post-Contract Award Schedule from the Owner, the General Contractor and the Sub-Systems Contractors shall indicate their approval or disapproval of the final results, in writing, to the Owner. In the event that no communication is received by

the Owner within five (5) days, the Individual Project Schedule(s) - Post-Contract Award shall be adopted and become the official scheduling document for the project(s).

A1.7 Relation of Scheduling Documents to Other Contract Documents: The schedule is not to be construed as a directive to the contractor(s) as to the "how" of the construction process, but only as a prescription of the Milestone Completion and Project Completion requirements relative to calendar date. The technical portions of the contract documents describing the work, its scope, and/or quality shall not be considered to have been abridged or modified by any statements made in the scheduling documents.

A1.8 Scope of Scheduling Activities: In listing, or naming the scheduling activities, no attempt is made to include all possible activities in the construction process, but only those which basically generate the progress of the project in broad terms. Whenever an activity is named, it is implied that all related and prerequisite activities necessary for the completion of that activity are included, as is whatever management, delivery, and layout procedure which might be related.

A1.9 Project Status Reports:

.1 At a frequency approximating twice monthly, throughout the duration of the project, the Scheduling Consultant shall inspect the project, review progress, and prepare a Project Status Report which will indicate, activity by activity, the exact status of the progress of the work. This report shall be distributed to all contracting parties, and shall form the basis for evaluation of the requirements of the contract relative to the project scheduling.

.2 All contractors shall offer full cooperation to the Scheduling Consultant in the review of the project progress and preparation of the Report Document, neither denying access to the project nor misrepresenting information regarding activity status.

A1.10 Schedule Revisions - "Updates": At undefined intervals during the project period, conditions may occur which require the schedule to be "updated" or revised and re-issued. Conditions under which this shall be undertaken are as follows:

.1 Revisions - No Extension of Contract Duration:

.1 Contract Revisions: The General Contractor may, due to logic re-evaluations, changing conditions, increased efficiency, or other reasons, wish to change the scheduling sequence. In this event, he may request, at his own expense, the Scheduling Consultant to revise the schedule as he directs, and issue it for review of the Owner and the Sub-Systems Contractors. Provided no extensions of completion requirements are included, and approvals of all of the above are obtained, the documents

will be re-issued in their revised format and shall become the Official Project Schedule.

.2 Uneven or unpredictable progress in portions of the work.

.3 Uneven or unpredictable delay in portions of the work.

.4 Delayed delivery of material to jobsite.

.5 Administrative and/or clerical insufficiencies of contractor(s).

.6 Holidays, or tradesmen shortages.

.7 Understaffing or undermanning any activity of the project.

.8 Corrections of work required by the Contract Documents.

.2 Revisions - Schedule Extension or Contract Adjustment Required:

.1 Strikes, riots, natural calamity.

.2 Late approvals of the Architect-Owner of items critical to job progress. In such instances, no less than two (2) weeks shall be allowed to the Architect-Owner for document processing, with a minimum of three (3) weeks for major shop drawings.

.3 Prerequisite work not in place or incomplete. (See Paragraph A1.12 of this Addendum)

.4 Direct losses to Critical Path activities due to inclement weather which comprises more than 25% of the work days in any one month during the project duration.

A1.11 Delay Documentation and Requests for Extension of Contract Duration:

.1 Delays in activities requiring extensions of the contract duration shall be documented by the Contractor(s), in cooperation with the Scheduling Consultant, on an activity-by-activity basis, showing exactly the activities which are prevented from progress and listing the reasons for each. Such information shall be in the hands of the Scheduling Consultant within one week of the actual delay inception, and within the same time period after work resumption. The exact duration of the allowable lost time will be calculated within the C.P.M. technical system and extensions, if any, determined. No blanket one-for-one daily time extension will be allowed, but only those extensions properly documented and particularly attributed to specific activities. Only legitimate extensions as described in Paragraph A1.10.2 above.

.2 In the event that a legitimate extension of the Contract Duration is indicated by the above analysis, the Contractor(s) shall submit, along with their official requests for time extension, a quotation for additional costs necessary to maintain the original Project Schedule or to maintain a minimal loss of time. The Owner shall then review the submissions and either:

.1 Extend the Contract Duration as indicated by the Updated Schedule, or

.2 Issue a Change Order covering the amount of the additional compensation required to maintain the original Project Schedule. The cost for revision of Scheduling Documents, in the exercise of either option, shall be borne by the Owner.

A1.12 Prerequisite Work:

.1 Notice and Agreement to Proceed: The General Contractor shall give final notification, in writing, to the Sub-Systems Contractor(s), in accordance with the requirements of the Project Construction Schedule as to the precise day of commencement of the work. The Sub-Systems Contractor(s) shall, upon receipt of such notification, inspect the site and, within five (5) days of the date of scheduled commencement of his work, indicate to the General Contractor, with a copy to the Owner, if there are any project conditions which prevent the work being commenced as notified. Failure to file such notification shall indicate that the Sub-Systems Contractor(s) find no impediment to the commencement of their work, nor to the prosecution of said work through conclusion.

.2 The filing of the above notification shall not prevent the Sub-Systems Contractor(s) from commencing the work and continuing until such time as further progress is impossible due to incompleteness or incorrectness of prerequisite work. The Sub-Systems Contractor(s) shall notify, immediately, the Scheduling Consultant as to the exact date of cessation of work, together with reasons for cessation, with a copy to the Owner and the General Contractor.

.3 The General Contractor, if unable to proceed with the project as required by the Project Schedule because of incomplete or incorrect work on the part of the Sub-Systems Contractor(s), shall notify the Owner and the Scheduling Consultant as described in Paragraph A1.11 of this Addendum.

.4 Failure to perform prerequisite work as required by the Project Schedule shall render the Contractor(s) liable to the provisions of Paragraph A1.15 of this Addendum governing penalties and assessments..

A1.13 Schedule Maintained:

.1 The Project Schedule will be considered as "maintained" when no activity has been started later than its "Late Start" nor completed later than its "Late Finish," as described by the Project Schedule Documents. In the event that such is the case, but the Contractor(s) have instituted logic or other revisions which nullify the delaying effects of such "Late Work," or if dependent or related activities have been commenced earlier than the

Schedule requirements such that the "Late" activities are offset, the Scheduling Consultant shall so indicate in the Project Status Report, and the Schedule will be considered "Maintained."

.2 The Schedule will be considered as not"Maintained" when any work activity is started later than the scheduled "Late Start" or completed later than the "Late Finish," as defined in the Project Scheduling Documents. The Schedule shall be considered "Maintained" when all activities which make up any particular Milestone are completed on or before the "Late Finish" for that Milestone, as defined by the Project Schedule Documents, even though some individual activities of the Milestones have been "Late," unless other Milestones or activities are "Late" as a result.

.3 All status evaluations will be made in accordance with the computer analysis of the Critical Path Method, as outlined and defined by the Scheduling Consultant and the Contract Documents.

A1.14 Payment Incentives:

.1 General Contractor: If, as indicated in the periodic Project Status Reports prepared by the Scheduling Consultant, the project remains "Maintained" as defined in Paragraph A1.13 above, the General Contractor may reduce the Owner's percentage of retainage to 3% of the amount of the monthly request for payment, applicable to all work completed as of the date of the payment request. If the progress is "Not Maintained," as described in Paragraph A1.13 above, the retainage applicable to that payment request shall revert to 10% of the application amount. If the schedule is not "Maintained," disqualifying the General Contractor for the reduced retainage above described, he may, in subsequent requests for payment, provided the project schedule is again "Maintained," re-apply for the reduced retainage amount, which will, if the project Schedule is in fact "Maintained" as of the date of the payment request, be paid retroactively on all work completed on the project.

.2 Sub-Systems Contractor(s): If, as indicated in the periodic Project Status Reports, the work of the Sub-Systems Contractor(s) is "Maintained" as defined in Paragraph A1.13 above, the Sub-Systems Contractor may, in his monthly Payment Request, reduce the Owner's retainage to 3% of the amount of the Payment Request for all work in place as of the date of the Periodic Status Report. If the work of the Sub-Systems Contractor(s) is "Late," as defined in Paragraph A1.13 above, the amount of retainage shall be 10% of the amount of the Payment Request.

.3 If the Sub-Systems Contractor(s) work is completed in accordance with the scheduling requirements of the Project Schedule, and in accordance with the contract documents, as determined by the General Contractor and the Owner, final payment of 100% of the contract amount will be paid the Sub=Systems Contractor within 90 calendar days of the date of the Final Payment Request.

A1.15 Assessment for Delinquent Work: If, as defined in Paragraph A1.13 of this Addendum, the Project Schedule is not "Maintained" by the General Contractor, or the Sub-System Contractor(s), such Contractor(s) shall forfeit to the Owner a daily assessment of Three Hundred Dollars ($300.00). Such assessment shall be levied on a five (5) day per week basis, and will be deducted from the Monthly Progress Payment during which the delinquent work occurs, or the month immediately following. The assessment shall remain in force until such time as:

.1 The rate of progress of the delinquent work is increased and the Project Schedule is thereby "maintained."

.2 The delinquent work is brought to completion even if, by so doing, the Project Schedule is not "maintained."

The assessment shall be refunded if:

.3 The delinquent work is brought to completion within the requirements of the Project Schedule.

.4 The Contractor(s) responsible for the delinquent work can, under the provisions of Paragraph A1.10.1 of this Addendum, revise the Project Plan, in cooperation with the General Contractor and the remaining applicable Sub-Systems Contractor(s), such that the fulfillment of the Milestone and Project Completion dates can be maintained. The Project Schedule will thereby be revised to reflect these revisions.

A1.16 Progress Acceleration: At any period during the project duration, the Owner may, at his own option, request of the General Contractor and/or the Sub-Systems Contractor(s) lump sum quotation to cover the cost of accelerating the progress of the work. Such requests shall be filed with the applicable contractor(s) in writing and shall stipulate the number of days the project is to be accelerated, and the number of days eadh Milestone is to be shortened. The contractor(s) shall respond to such request not later than five (5) working days of its receipt and the amount shown therein shall be the basis for the issuance of a Change Order on the work to cover progress acceleration. The Project Schedule shall be revised to reflect the accelerated schedule at no cost to the contractor(s) and must be approved by all contractors affected.

A1.17 General Requirements:

.1 Bidders, in submitting proposals, acknowledge the inclusion of any premium time for accelerated construction and/or fabrication of material which is required to meet scheduling requirements.

.2 This schedule makes no manpower count mandatory, but leaves to the judgment of the Contractor(s) the crew sizes required to "maintain" the Project Schedule at no additional cost to the Owner.

.3 Sub-Systems Contractors shall be prepared to authorize factory overtime in any situation where such is required by the Project Schedule at no additional cost to the Owner. Delivery dates for all material will be as required by the Project Schedule(s).

.4 It is requisite of the General Contractor that the Owner be notified as soon as it is apparent that deliveries which are under the responsibility of his contract will be delinquent and adversely affect the Project Schedule. Such delays shall be evaluated as to their responsibility under the definitions of Paragraph A1.10 of this Addendum to the Specifications. The General Contractor shall have all material suppliers submit an acknowledgment of material ordering dates and promised shipping and delivery dates. A copy of this information shall be submitted to the Owner and to the Scheduling Consultant.

.5 Correction of work not in conformance with the requirements of other sections of the Specifications, or the Contract Documents in general, shall not be grounds for legitimate delay of the Project Schedule, and shall be undertaken at no additional cost to the Owner.

A1.18 Definitions of Scheduling Terms: Terms will be normally understood by the use of the general CPM System, with specific clarifications as defined by the Scheduling Consultant:

.1	Milestone:	A collection of activities which comprise the work of a particular definition as indicated on the CPM Documents.
.2	I node:	The starting node of any activity.
.3	J node:	The completion node of any activity.
.4	Activity:	The package of work which is listed in the CPM Documents comprising the Project Schedule.
.5	DUR:	Indicated the estimated duration of any activity.
.6	LAG:	Indicates the number of days the activity "lags" its start from the day of its starting node.
.7	LEAD:	Indicates the number of days the activity is to finish on a "late finish" basis prior to the completing node of the activity.
.8	DESCRIPTION:	Defines in words the basic activity.
.9	ES:	Indicates the Early Start of an Activity or Milestone.
.10	EF:	Indicates the Early Finish of an Activity or Milestone.
.11	LS:	Indicates the Late Start of an Activity or Milestone.
.12	LF:	Indicated the Late Finish of an Activity or Milestone.

.13 TF: Indicates the Total Float assigned to a chain of activities.

.14 KEY: Indicates the Contract Number of the activity to which it is assigned.

.15 KUB: Indicates the trade assignment of the activity to which it is assigned.

.16 Prerequisite work: Any activity which prevents, if not complete or only partially complete, the continuance of the Project Schedule through the delay or stoppage of subsequent activities of work.

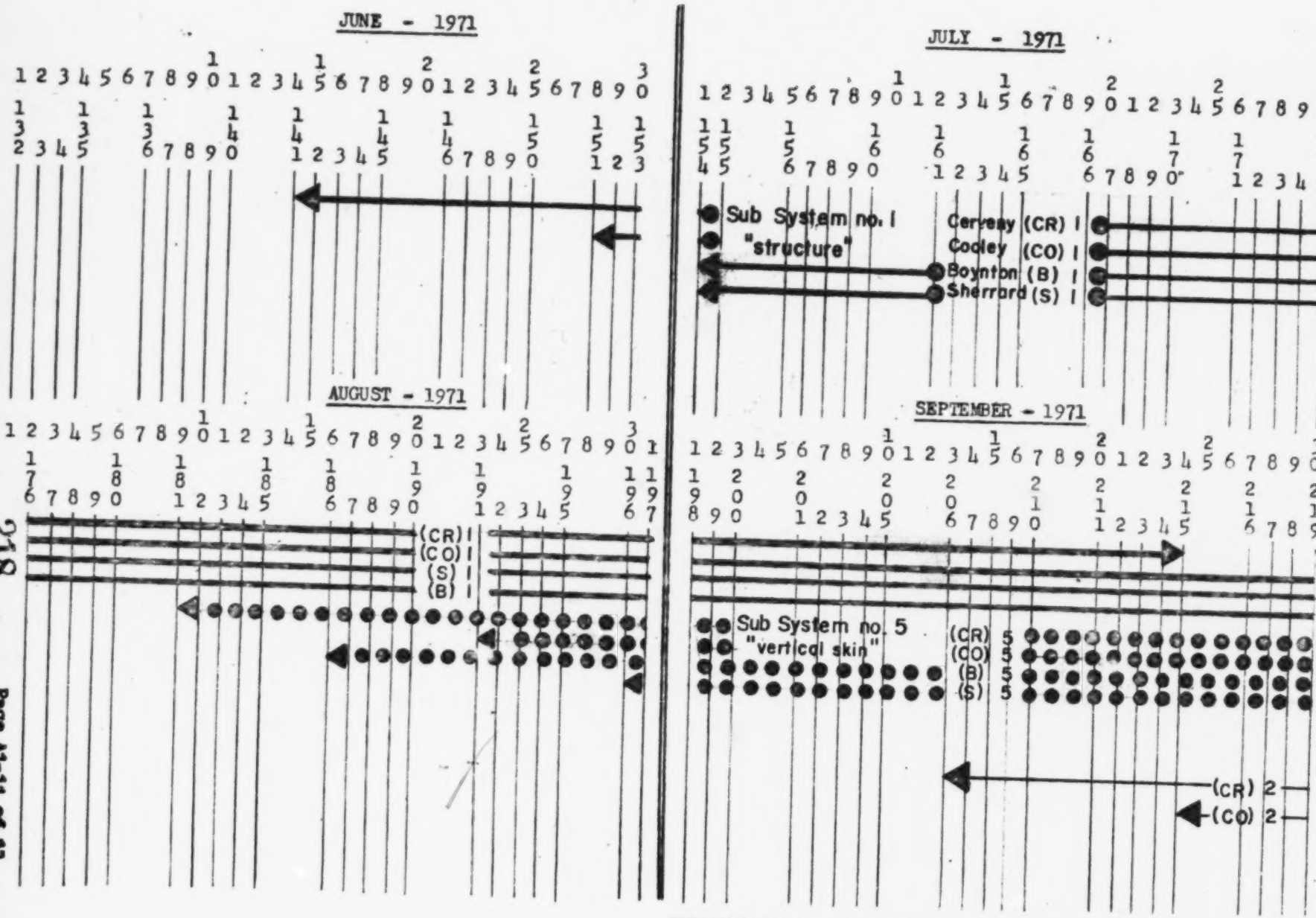
.17 Delinquent work: Work which, as indicated in the Project Status Reports, renders the Project Schedule as not "maintained."

A1.19 Documents: All Scheduling Documents, both Pre-Bid and Post-Contract, will be supplied to the Contractor(s) by the Owner, and will be distributed with the Contract Documents.

SUB-SYSTEMS SCHEDULING GUIDELINES -- Calendar Period for Sub-Systems Installation

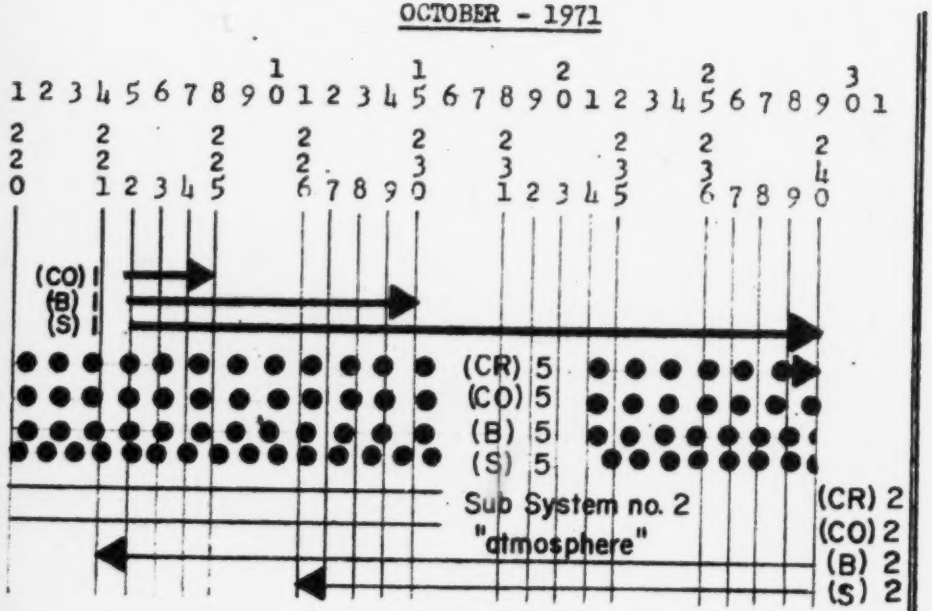
		Sub-System #1 (Structure)	Sub-System #2 (Atmosphere)	Sub-System #3 (Lighting-Ceiling)	Sub-System #4 (Interior Space Division)	Sub-System #5 (Vertical Skin)
CERVENY SCHOOL: (CR)	Early Start:	14 June '71	13 Sep. '71	24 Jan. '72	7 Feb. '72	9 Aug. '71
	Late Finish:	24 Sep. '71	28 Apr. '72	12 May '72	26 May '72	29 Oct. '71
COOLEY SCHOOL: (CO)	Early Start:	28 June '71	24 Sep. '71	7 Feb. '72	21 Feb. '72	23 Aug. '71
	Late Finish:	8 Oct. '71	28 Apr. '72	12 May '72	26 May '72	19 Nov. '71
BOYNTON SCHOOL: (B)	Early Start:	1 July '71	4 Oct. '71	10 Jan. '72	14 Feb. '72	16 Aug. '71
	Late Finish:	15 Oct. '71	3 Mar. '72	21 Apr. '72	28 Apr. '72	26 Nov. '71
SHERRARD SCHOOL: (S)	Early Start:	1 July '71	11 Oct. '71	24 Jan. '72	28 Feb. '72	30 Aug. '71
	Late Finish:	29 Oct. '71	17 Mar. '72	28 Apr. '72	5 May '72	10 Dec. '71

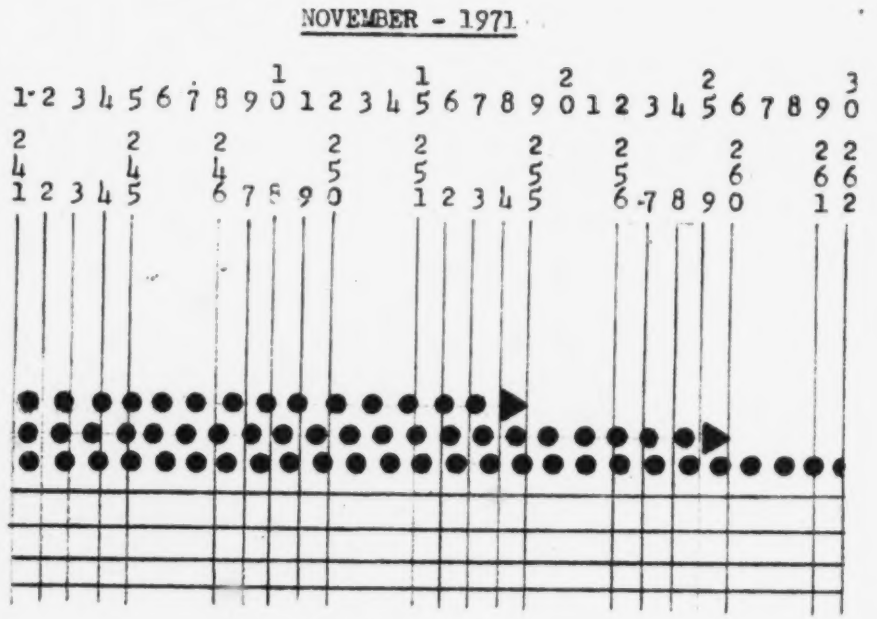
Sub-Systems Contractors shall be prepared to install the work of their section between the dates shown above, and on the bar-graph of the following three pages. Actual durations, and dates of beginning and ending, will be as developed in the Individual Project Construction Schedule(s), in conjunction with the General Contractor, upon award of General Contract.

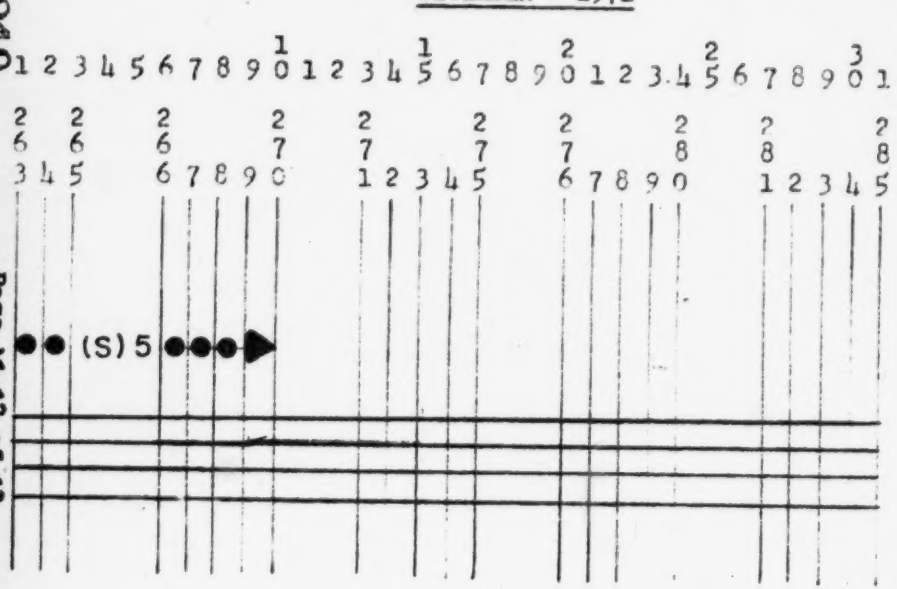


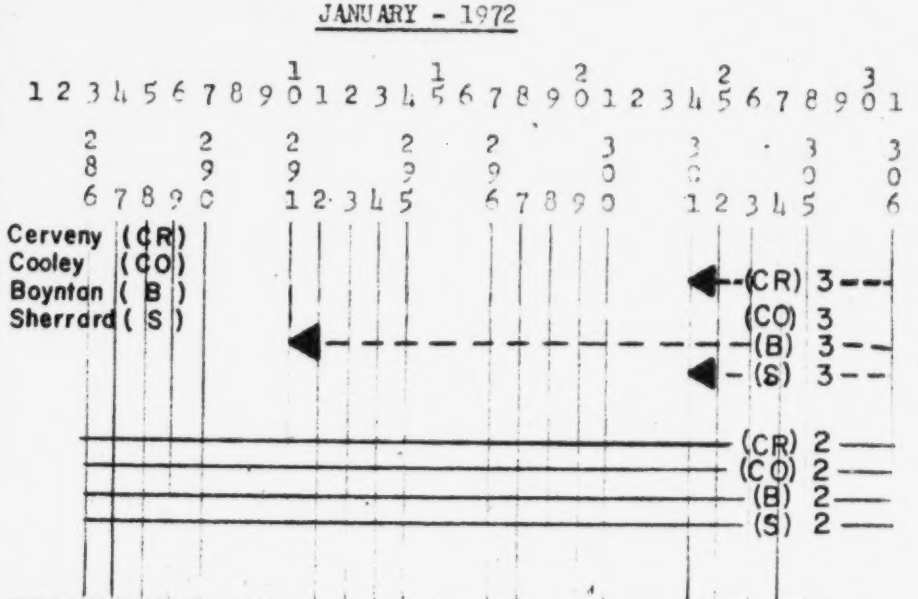
DETROIT PUBLIC SCHOOLS — CONSTRUCTION SYSTEMS PROGRAM

Sub-Systems Scheduling Guidelines









DETROIT PUBLIC SCHOOLS – CONSTRUCTION SYSTEMS PROGRAM
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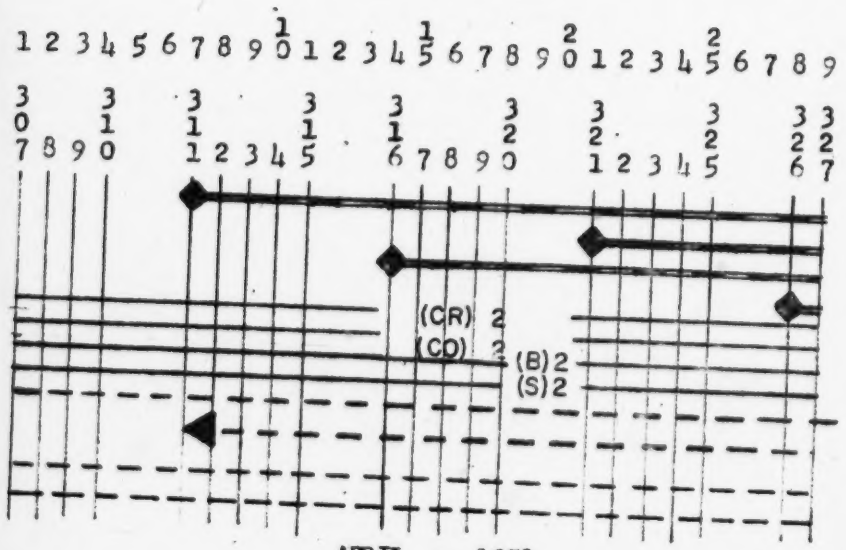

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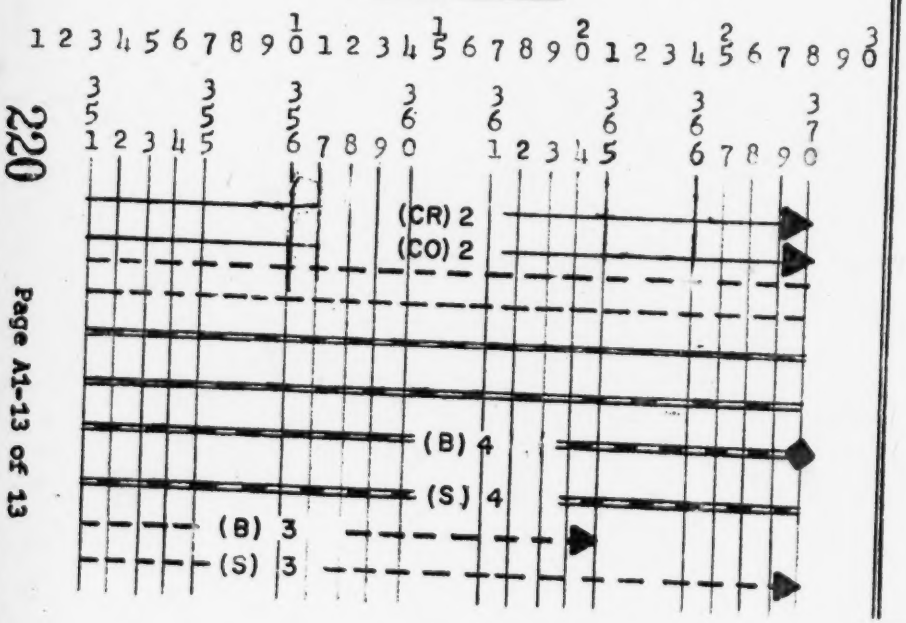

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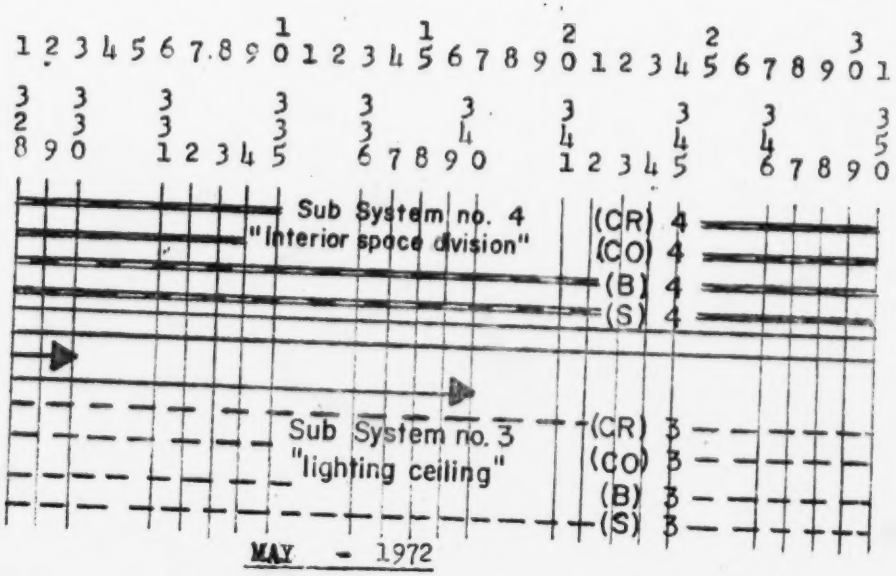

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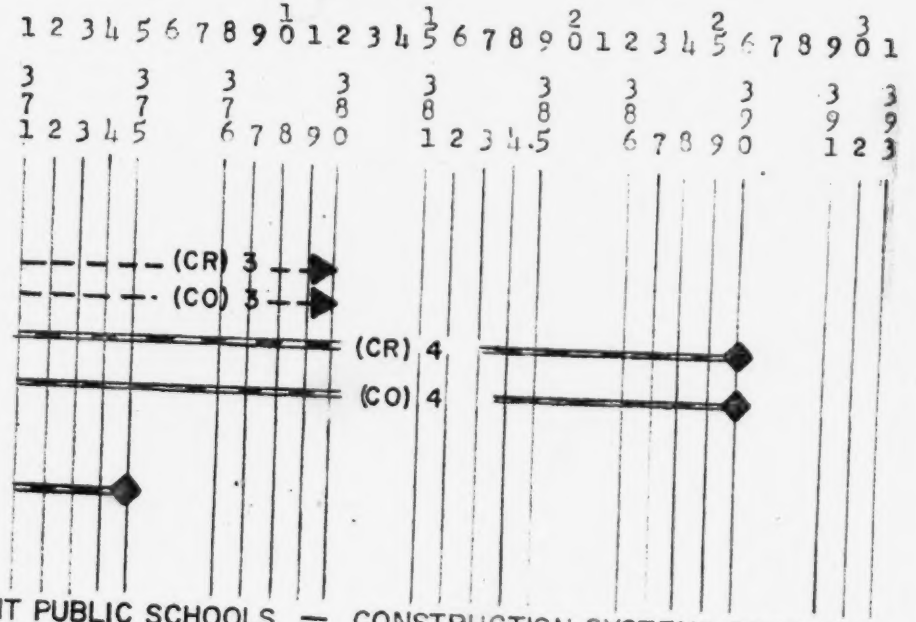


DETROIT PUBLIC SCHOOLS — CONSTRUCTION SYSTEMS PROGRAM
Sub Systems Scheduling Guidelines

December 21, 1970

Detroit Public Schools
CONSTRUCTION SYSTEMS PROGRAM
51 West Hancock Avenue
Detroit, Michigan 48201

ADDENDUM NO. 2 - C.S.P. FIRE PROTECTION INTERPRETATIONS

The drawings and specifications for the First CSP Building System are modified, corrected, augmented, or supplemented as follows, and this Addendum No. 2 is hereby made a part of the contract documents.

A2.1 Following a review by the Board of Rules and Appeals of the Department of Buildings and Safety Engineering of the City of Detroit on November 12, 1970, authorization was granted to change Table No. 6 of the Official Building Code of the City of Detroit to conform to Table No. 6 of The BOCA Basic Building Code/1970 in regard to "Use Group F-4 (Schools)." This authorization permits somewhat larger area limitations than previously allowed.

A2.2 After a subsequent review by the Administrative Committee of the Department of Buildings and Safety Engineering of the City of Detroit, interpretations regarding fire protection requirements were recorded on submitted plans of the four projects in the First CSP Building System. Interpretations have been noted on bidding documents on file in the Department of Buildings and Safety Engineering and the CSP Office. Plans have been marked "Approved" as of November 9, 1970.

A2.3 For the convenience of bidders, the aforementioned interpretations are noted below. Bidders are also referred to both the Official Building Code of the City of Detroit and to the State of Michigan code document, Fire Prevention Section, School Bulletin 412 for additional and more specific aspects of fire protection, such as protected exitway (corridor) requirements, sprinkler requirements, and other factors which might affect the acceptability by the official regulatory agencies of the various sub-system proposals. The noting herewith of these interpretations does not relieve bidders from responsibilities outlined in the documents to secure necessary approvals from all agencies having jurisdiction.

A2.4 All four additions must be separated from their existing buildings by 2-hour fire walls at the connecting links or wherever the additions abut the existing buildings. All openings in these walls are to be protected with doors and frames of "B" label construction with necessary labels to certify compliance. Ducts must be fire-dampered when penetrating these walls.

ADDENDUM NO. 2 (continued)

A2.5 BOYNTON SCHOOL ADDITION:

.1 Gymnasium #15 and Dining-Assembly #14, including the Corridor between them, may be designated Type 2C "Unprotected" construction if separated from adjacent areas of the addition by 2-hour fire walls (or approved openings) to the roof deck of the separated area.

.2 Other portions of the addition, including the two-story portion, will require 1-hour fire protection of structure, which can be provided by an approved 1-hour rated ceiling assembly and 1-hour protection on columns. For this area, the requirements of Michigan Code 412-F take precedence over the Detroit Building Code.

A2.6 CERVENY SCHOOL ADDITION:

.1 The two-story portion of the addition will require 1-hour fire protection of structure, which can be provided by a 1-hour rated ceiling assembly and 1-hour protection of columns. For this portion, the requirements of Michigan State Code 412-F take precedence.

.2 The one-story portion of the addition may be designated as Type 2C "Unprotected" construction; however, area limitations will require a 2-hour fire wall (or approved openings) to the roof deck to separate the addition into smaller areas. The suggested separations are along Column Lines No. 8 and 14, including separation of the Storage Areas of the west end of Cafetorium No. 9

A2.7 SHERRARD SCHOOL ADDITION:

.1 The entire addition may be designated Type 2C "Unprotected" construction; however, area limitations will require a 2-hour fire wall (or approved openings) to the roof deck to separate the addition into two major areas. The suggested 2-hour separation would approximate Column Lines No. 11 (east part) and No. 12 (west part).

A2.8 DELBERT E. ROBERTS ADDITION to THOMAS COOLEY HIGH SCHOOL:

.1 Auto Mechanics Shop No. 1 and its auxiliary spaces (west of Column Lines No. 4 & 5) must be separated from adjacent portions of the addition by 2-hour fire walls (or approved openings) to the roof deck of the separated area.

.2 Because of the plan configuration and the proportion of interior student-occupied space, the two-story portions of the addition must be provided with complete sprinkler protection as well as 1-hour fire protection of structure as called for under Michigan State Code 412-F. The required protection can be provided by an approved 1-hour rated ceiling assembly and 1-hour protection of columns.

December 31, 1970

Detroit Public Schools
CONSTRUCTION SYSTEMS PROGRAM
51 West Hancock Avenue
Detroit, Michigan 48201

ADDENDUM NO. 3 - CLARIFICATIONS to SPECIFICATIONS

The drawings and specifications for the First CSP Building System are modified, corrected, augmented, or supplemented as follows, and this Addendum No. 3 is hereby made a part of the contract documents.

A3.1 Page 3, Drawing List - SHERRARD SCHOOL ADDITION. Add drawing on Page No. A3-8 with revised plan layout and changes indicated to drawings previously issued as follows: ST-1, ID-1, VS-1 and VS-2.

A3.2 Page II-1-4, General Conditions, Article 7.1, Shop Drawings. Add wording to first sentence as follows: ". . . and schedules, or one copy of reproducible sepia, required . . ."

A3.3 Page II-2-8, Supplementary General Conditions, Article 23.1. Change third word in first sentence to "Contractor."

A3.4 Page II-2-11, Supplementary General Conditions. Add new article:

Article 30. Temporary Heat

30.1 Throughout the project duration, between the months of December and April, the General Contractor shall provide temporary heat, within the confines of the building addition, of a type and quality as defined in the drawings and specifications of the Contract Documents. Such heat shall be of sufficient quantity and distribution as to allow the uninterrupted progress of all trades working within the building confines, in accordance with the requirements of the Individual Project Construction Schedule(s).

30.2 Temporary heat, as above described, shall be instituted in the project(s) at the time of building "enclosure," which is defined as:

.1 At least 75% of all permanent wall surface materials in place.

.2 The remaining 25% of the wall surface covered by suitable temporary material such as to contain temporary heat within the building confines.

30.3 Temporary enclosure, as defined in Paragraph 30.2.2 above requisite for temporary heat, shall be installed in sufficient time to allow installation of temporary heat, as above defined, and eliminate schedule delays. Temporary enclosure will not be required if permanent materials are installed in sufficient time as to not require delay in the Project Schedule.

A3.4 (cont) Article 30. Temporary Heat (cont)

30.4 All fuel, operational, maintenance, and other expenditures relative to the maintenance of temporary heat, as above described, shall be borne by the General Contractor. The General Contractor shall, in the appropriate position on the Bid Proposal Form, indicate the per diem refund rate for temporary heat, as above described, which might not be required because of weather conditions, or conditions of the project. Bid Proposals shall contain the full costs estimated for the time period indicated in Paragraph 30.1 above. Per diem refunds shall be deducted from this amount. The amount estimated for temporary heat shall be listed on the Bid Proposal form, at the appropriate position.

30.5 Temporary heat required by Sub-Systems Contractors prior to building "enclosure" shall be provided by the contractor(s) requiring such heat, and shall be of sufficient quantity and distribution as to allow for continuation of the work as required by the Individual Project Schedule(s). All fuel, maintenance, and personnel required for such heat shall be borne by the contractor(s) requiring such heat for purposes of completing their own work. All temporary enclosure(s) required under this paragraph shall be provided by and paid for by the contractor(s) requiring such temporary heat and enclosure.

A3.5 Page III-1-9, SUB-SYSTEM NO. 1 - STRUCTURE, Article 1.7.1.3.1. Add sentences as follows: "Where indicated on the drawings, the values of the wind moment not reduced are applied to the top of the one-story columns and at the floor level of the two-story columns. The values of all such wind moments at each location as indicated on the drawings (see Legend) is 22 ft. kips unless otherwise noted."

A3.6 Page III-2-2, SUB-SYSTEM NO. 2 - ATMOSPHERE, Articles 2.2.1.8.4 and 2.2.1.9. Substitute as follows:

2.2.1.8.4 Where electrical baseboard heating is used, power wiring from heating elements to distribution panels shall be included. Distribution panels shall be provided by the Atmosphere Contractor.

2.2.1.9 Equipment Bases, Vibration Isolation Equipment, Concrete Pads, Duct Lining, and Sound Attenuators shall be provided to guarantee sound ratings specified.

A3.7 Page III-2-3, SUB-SYSTEM NO. 2 - ATMOSPHERE. Add article as follows:

2.2.2.10 All baseboard heating specified shall be located under windows and on exterior walls for classrooms and offices only.

A3.8 Page III-2-11, SUB-SYSTEM NO. 2 - ATMOSPHERE, Article 2.5.2.7. Add wording as follows: ". . . provided along perimeter walls and under windows and shall . . ."

A3.9 Page III-2-22, SUB-SYSTEM NO. 2 - ATMOSPHERE, Article 2.6.2.2. Add the following sentence:

Air Balance reports shall be submitted for all air handling systems using Sheet Metal Contractors Test Report forms.

A3.10 Page III-2-23, SUB-SYSTEM NO. 2 - ATMOSPHERE, Article 2.6.4.1. Delete the third sentence, "Thermostats . . . . spaces."

A3.11 Page III-2-24, SUB-SYSTEM NO. 2 - ATMOSPHERE, Article 2.6.4.6. Revise as follows:

2.6.4.6 In the interest of flexibility the thermostat shall be located as follows: Either on demountable or fixed partition service panels or exposed, directly accessible through a hinged or easily removable panel. Mounting height of the thermostat shall be 5'-0" above the floor plane.

A3.12 Page III-2-24, SUB-SYSTEM NO. 2 - ATMOSPHERE, Article 2.6.4.7. Delete entire article; renumber Article 2.6.4.8.

A3.13 Page III-2-27, SUB-SYSTEM NO. 2 - ATMOSPHERE, Article 2.6.10.3. Revise as follows: ". . . from the distribution panel board through . . ."

A3.14 Page III-2-32, SUB-SYSTEM NO. 2 - ATMOSPHERE, Article 2.7.4.2. Add paragraph as follows:

Bidders shall submit with their bids the Annual Owning and Operating Cost back-up information for each school, herein called Form F-1, a sample of which is herewith included.

F-1

ANNUAL OWNING & OPERATING COST

For

_____SCHOOL

NOTES:
1. For basis of calculations refer to Item 2.7.2
2. Attach detailed calculation for each item

Calculated Heat Loss...MBH_____ Total Air Circulated...CFM_____
Calculated Heat Gain...MBH_____ Minimum Outdoor Air ...CFM_____

CAPITAL COST

Atmosphere System	$_____
Mechanical Floor Area____Sq.Ft. @ $_____Total	$_____
Chimney	$_____
TOTAL	$_____

ANNUAL OWNING COST @ 8.7% OF TOTAL $/Yr._____

OPERATING ENERGY COST

Heating (Fuel_____)	$/Yr._____
Auxiliaries	$/Yr._____
Cooling (Fuel_____)	$/Yr._____
Auxiliaries	$/Yr._____
Lighting	$/Yr._____
Domestic Hot Water Heating (Fuel_____)	$/Yr._____
	$/Yr._____

OPERATORS' AND MAINTENANCE COST

/See Proposal No. 2, Page III-2-P.4 (Form F-2)_7

Operators' Cost	$/Yr._____
Maintenance Contract	$/Yr._____
OPERATORS' AND MAINTENANCE COST	$/Yr._____
TOTAL ANNUAL OWNING AND OPERATING COST	$/Yr._____

A3.15 Page III-2-32, SUB-SYSTEM NO. 2 - ATMOSPHERE. Add the following article:

2.7.4.2 Bidders may submit an alternate price for a remote monitoring panel for a central location in the new addition with lights and switches provided to enable the custodial personnel to monitor and operate the equipment provided for heating and air conditioning. The following lights and switches shall be provided:

.1 System - A switch to have on, off, or automatic to control the unit from the remote location. When placed in the OFF position, it allows the unit to complete its operation before shut down. When placed in the Automatic position, it allows for complete operation including the night set back cycle.

.2 Refrigeration - A switch to control the operation of the refrigeration equipment.

.3 Fan - A light indicating operation of the fan.

.4 Filter - A light indicating a need to change the filters or manually advance roll filter media.

.5 Heat - A light indicating a safety shut down of the heat source.

.6 Crank Case Heater - A light indicating a failure of the compressor crank case heater.

.7 Low Pressure Time Out - A light indicating either a low pressure refrigerant condition or a time-out cycle after a normal shut down or the restoration of a failure.

.8 Oil Pressure - A light indicating a failure of the oil pressure to build up in the refrigeration compressor.

.9 Hi-Pressure, Hi-Motor Temp. - A light indicating either a refrigerant high pressure or a high motor temperature condition.

A3.16 Page III-2-P3, SUB-SYSTEM NO. 2 - ATMOSPHERE. In Proposal No. 2, Article P.7.1, the notation "5 Year Service Contract with Option for 10 Years" should be deleted and instead appear on Page III-2-P4 in Article P.7.1 following the final sentence:

5 Year Service Contract with Option for 10 Years ($_____ per year.)

A3.17 Page III-2-P.4, SUB-SYSTEM NO. 2 - ATMOSPHERE. Operators' and Maintenance Cost should read: F-2 OPERATORS' AND MAINTENANCE COST.

A3.18 Page III-3-P.2, SUB-SYSTEM NO. 3 - LIGHTING-CEILING. In Proposal No. 3 following "Interfacing Bidder by Choice re: Sub-System No. 4 - Interior Space Division" add the following paragraph:

Re Sub-System No. 5 - Vertical Skin

1st _____ Base Bid_____

2nd _____ _____

3rd _____ _____

A3.19 Page III-4-4, SUB-SYSTEM NO. 4 - INTERIOR SPACE DIVISION. In Article 4.3.6.4, change the fourth sentence to read:

"Provisions for double glazing shall be included in relocatable partitions."

A3.20 Page III-4-P3, SUB-SYSTEM NO. 4 - INTERIOR SPACE DIVISION. In Proposal No. 4, Article P.7.1, Item 1, Sub 3, change to read:

"3. Wire glass above 3'-6"."

A3.21 Page III-4-P4, SUB-SYSTEM NO. 4 - INTERIOR SPACE DIVISION. In Proposal No. 4, Article P.7.1, Item 2, Sub 2, change to read:

"2. Wire glass above 3'-6"."

A3.22 Page III-4-P4, SUB-SYSTEM NO. 4- INTERIOR SPACE DIVISION. In Proposal No. 4, Article P.7.1, Item 4, Sub 4, add the following:

"2 @ 3'-0" x 7'-0" Acoustic Rated - ADD $_____ or DEDUCT $_____."

A3.23 Page III-5-1, SUB-SYSTEM NO. 5 - VERTICAL SKIN. In Article 5.2.2, delete last sentence: "Column covers . . . . columns."

A3.24 Page III-5-2, SUB-SYSTEM NO. 5 - VERTICLE SKIN. To Article 5.2.3, add the following sentence:

"Column covers for free standing exterior sub-system columns."

A3.25 Page III-5-P2, SUB-SYSTEM NO. 5 - VERTICAL SKIN. In Proposal No. 5, Article P.3 - Interfacing Bidder by Choice - after "Sub-System No. 1 - Structure" insert the following paragraph:

Re Sub-System No. 2 - Atmosphere

1st _____ Base Bid_____

2nd _____ _____

3rd _____ _____

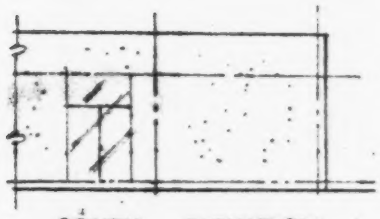
A3.26 Page III-5-P2, SUB-SYTEM NO. 5 - VERTICAL SKIN. In Proposal No. 5, under Article P.6, Cost Breakdown per School, list opaque wall vertical surface area in s.f. per school.

A3.27 Page III-5-P3, SUB-SYSTEM NO. 5 - VERTICAL SKIN. In Proposal No. 5 change Article P.7.1 to read:

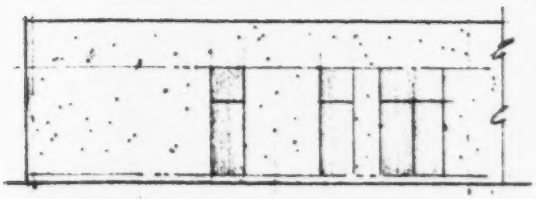
P.7.1 Number and Description of Unit Prices:

NOTE: for bid comparison purposes assume no vented openings in the lump sum bid.

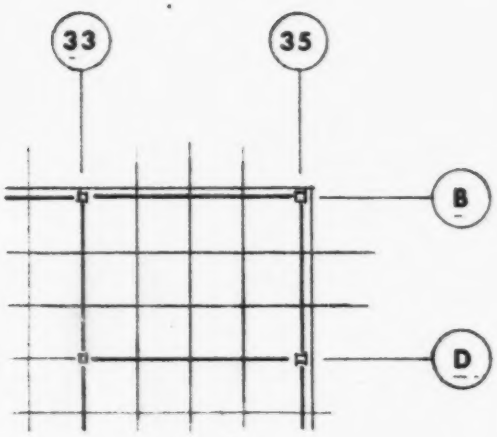
	ADD	DEDUCT
1) Opaque Wall per square foot vertical surface area	$_____	$_____
2) Door and Frame Unit		
3'-0" x 7'-0" Solid	$_____	$_____
3'-0" x 7'-0" Glazed	$_____	$_____
2 @ 3'-0" x 7'-0" Solid	$_____	$_____
2 @ 3'-0" x 7'-0" Glazed with glazed transom	$_____	$_____
2 @ 3'-0" x 7'-0" Glazed with glazed side lights and transoms	$_____	$_____
3 @ 3'-0" x 7'-0" Glazed with glazed side lights and transoms	$_____	$_____
3) Per glazed opening		
a. Operable Unit 10 to 20 s.f. (Assume minimum vent size of 784 sq.in. in accordance with State Code 412F.)	$_____	$_____
b. Fixed Unit 10 to 20 s.f.	$_____	$_____
c. Fixed Unit 20 to 40 s.f.	$_____	$_____



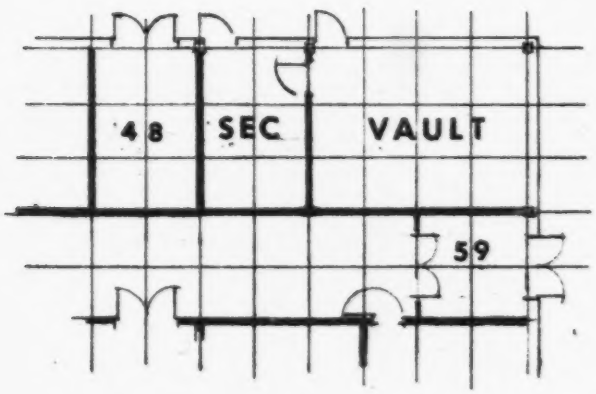
SOUTH ELEVATION



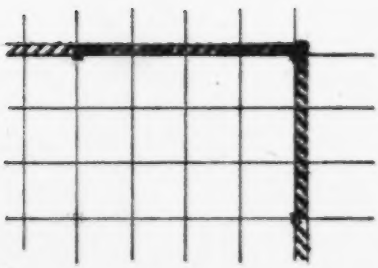
EAST ELEVATION



ST-1



ID-1



VS-1

PROJECT TITLE

SHERRARD SCHOOL ADDITION
for School Housing Division
Board of Education
Detroit, Michigan

Date: December 31, 1970